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CONTENTS

DIESEL RAILWAY TRACTION

A Supplement illustrating and describing developments in Diesel Railway Traction is presented with each copy of this week's issue.

Ernest Pendarves Leigh-Bennett

FEW descriptive writers have so happily combined accuracy with entertaining style in describing the many phases of industrialism as the late Mr. E. P. Leigh-Bennett (otherwise "Dell Leigh") who died in London on Friday last. Railways, motor works, and docks were among the many subjects of his writings, and the result—in the words of an appreciation in *The Times*—"always delighted the employer, pleased the workman, and enthralled the ordinary man-in-the-street." His major work was done for the Southern Railway, which in 1925 asked him to roam about its system and write a quarterly article on anything he thought would interest season-ticket holders. How greatly he succeeded his famous "Over the Points" has shown, for passengers who missed their copy would write indignantly to Waterloo to know why it had miscarried. It is therefore fitting that the appreciation to which we have referred should come from the pen of "J.B.E."—initials that will be recognised by the discerning as those of the one best able to judge Leigh-Bennett's work. As "Dell Leigh" he contributed a fine series of descriptive articles for the L.N.E.R., which appeared as advertisements in newspapers all over the country, including THE RAILWAY GAZETTE. These were afterwards issued in book form under the title "On the Line," and this fascinating little volume was followed by "Cameos of Three Counties" covering the territory from the Humber to the Tweed. Leigh-Bennett was probably without equal as a free-lance journalist in interpreting dull but essential occupations in terms of romance, and his passing leaves a gap it will not be easy to fill.

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Three Months' Passenger Train Traffics

In considering the Ministry of Transport analysis of passenger train traffics of British standard gauge railways (excluding London Transport) for the first three months of 1937 it must be remembered that this period included the Easter holiday figures, whereas in 1936 the corresponding holiday was entirely in April. Nevertheless an increase of £110,455, or 8·24 per cent. in receipts from standard fares during the period is remarkable, even although £77,640 of this increase came in the holiday month of March. First class receipts (apart from season tickets) amounted for the first quarter of 1937 to £872,036, an increase of £79,577, of which £44,331 was in March, and represented 9·37 per cent. of the total ordinary passenger receipts. First class ordinary passengers numbered 3,504,377, an increase of 65,970. That the second class receipts of the Southern Railway during the quarter improved by £44,568, or 59·45 per cent., is some index of the further revival in Continental traffic. Standard fares for the quarter for all companies brought in £1,451,583, representing 15·60 per cent. of the total receipts from ordinary passengers. From monthly return and period excursions the receipts were £3,051,697, an increase of £621,406, or 25·57 per cent., and day, half-day, and evening excursions produced £2,818,947, an increase of £145,175, or 5.43 per cent. From season tickets the receipts were £2,209,903, an increase of £29,664, or 1·36 per cent., and from parcels and miscellaneous traffic £2,979,024, an improvement of only £781, or 0·03 per cent.

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The Week's Traffics

For the first twenty-six weeks of this year the four group railways have secured gross receipts of £78,251,000, an increase of £3,545,000, or 4·75 per cent., over the figures for the corresponding period of 1936. The increase for the past week is £217,000, against one of £135,000 for the previous week. Passenger train traffics provide £76,000, coal £75,500, and merchandise £65,500 of the week's increase. For the year to date the contributions to the total receipts of the four companies were:—£32,867,000 from passenger train traffic, an increase of £1,426,000; £28,248,500 from merchandise, a net increase of £904,500; and £17,135,500 from coal, a net increase of £1,214,500.

	26th Week				Year to date	
	Pass., &c.	Goods, &c.	Coal, &c.	Total	Inc. or Dec.	
	£	£	£	£	£	%
L.M.S.R. ..	+ 29,000	+ 20,000	+ 16,000	+ 65,000	+1,329,000	+ 4·37
L.N.E.R. ..	+ 35,000	+ 38,000	+ 39,000	+112,000	+1,187,000	+ 5·37
G.W.R. ..	− 4,000	+ 4,000	+ 20,000	+ 20,000	+ 670,000	+ 5·40
S.R.	+ 16,000	+ 3,500	+ 500	+ 20,000	+ 359,000	+ 3·67

Great Northern (Ireland) traffics for the week show an increase of £100, reducing the decrease for the year to date to £13,900. On the Great Southern the week's increase was £137, and the decrease to date is £19,970.

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Road Transport in Northern Ireland

A statement has been issued by the Provincial Hauliers' Association of Northern Ireland as to the effect upon owners of road transport undertakings for passengers and goods of the Road and Railway Transport Act (Northern Ireland), 1935. For the most part it deals with the question of compensation to owners whose undertakings have been acquired under the Act. One of the chief

complaints is that the Arbitration Tribunal appointed to assess the consideration to be paid by the Road Transport Board to the owners of undertakings acquired has treated its proceedings as strictly private, thereby making a notable departure from the practice of the London Traffic Arbitration Tribunal, and of the arbitration tribunal which determined the prices to be paid by the Metropolitan Water Board for water undertakings acquired. It is stated that the Act is not being applied so as to give these owners anything approaching proper compensation for the value of their undertakings, still less proper compensation for loss and injury. Particular attention is called to the case of owner-operators and owner-managers. Complaint is also made of the delay in the board's payment of compensation to owners, and of the payment of a substantial part of the compensation in stock instead of cash, particularly as the absence up to the present of any published accounts is depreciating the value of the stock. The Government is to be asked to take immediate action, even though it involves an amendment of the Act of 1935, to ensure that the undertakings given when the measure was first introduced should be carried out.

* * * *

A Centenary Exhibition

To commemorate the centenary of opening of the Grand Junction Railway and the first section of the London & Birmingham, a special exhibition is being held at the Science Museum, South Kensington, London. The exhibits are most fascinating, and comprise guides, maps, plans, companions, tickets, charts, letters and other documents, and even a jig-saw puzzle, relating to these two railways. A few of the more interesting items of the exhibition are, an estimate for building Euston station, a policeman's truncheon, and an Inspector's tip-staff (L.B.R.), George Stephenson's Will, Seal of the L.B.R., a cast of Hardwick's Euston Arch medal, draft agreement for the amalgamation of the L.B.R. and G.J.R., and a very instructive series of illustrations showing the L.B.R. in course of construction. The exhibits have been loaned for the occasion by the L.M.S.R., Mr. C. F. Dendy-Marshall, Mr. John Phillimore, and others. The exhibition is free to the public and will remain open until September 30. The Grand Junction Railway was opened throughout on July 4, 1837 (see THE RAILWAY GAZETTE, July 2, page 4), and the first section of the London & Birmingham Railway—from London to Boxmoor—on July 20, 1837, though the whole line was not opened until September 17 of the following year.

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Supplements for Speed

As recently as June 15, 1934 (in our *Diesel Railway Traction Supplement*) we mentioned as a novelty for a British non-Pullman train the supplementary fare of 2s. 6d. charged to passengers by the G.W.R. Birmingham-Cardiff railcars. Although that supplement was dropped with the introduction of the 1935 summer timetables, other similar examples have increased with the advent of high-speed trains. Practice in this respect is variable. The L.M.S.R. has a uniform fee (2s. 6d.) for passengers of both classes by The Coronation Scot between London and Glasgow, or London and Carlisle (Carlisle-Glasgow traffic is not conveyed). On the L.N.E.R. Coronation express, the supplement varies according to class and distance, as on the Silver Jubilee, being 6s. first class and 4s. third class for the London-Edinburgh journey. On the down train there is a uniform supplement of 4s. first and 2s. 6d. third for the London-York or York-Edinburgh sections, while on the up service the fee is 3s. first and 2s. third from Edinburgh to Newcastle, and the ordinary Silver Jubilee supplements from Newcastle to London. The problem of preventing undue occupation of the observation car of the Coronation is tackled by charging 1s. for a session limited to one hour. It is also felt that a certain spreadover in the service of meals and refreshments on the train will help to keep passengers circulating.

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"Buying Coal to Save Coal"

The nuisance of the pitfall subsidence, with its attendant evils of speed restriction, loss of time, and added coal consumption in the recovery of speed by trains from the slacks so imposed, is familiar to every main line British railway except, perhaps, the Southern, whose acquaintance with colliery areas is confined to the modest and relatively recent development of the Kent coalfields. Against the owners of the mineral rights over which the railways pass there is apparently no redress, and on the railways there falls the expense of restoring the level of the tracks which have thus been undermined, as well as the loss arising from the causes previously mentioned. The main line of the L.M.S.R. near Polesworth, between Nuneaton and Tamworth, at a point where the speed of express trains would normally rule high has suffered in this way for 25 years, necessitating a speed restriction of 30 m.p.h. The company having purchased the mineral rights under its main line at this point, has now made matters good below the surface, and has reballasted and restored the track to its previous condition, so permitting the resumption of full speed. The cost of lifting the track nearly a foot a year has been calculated, together with that of the energy wasted in the slowing of the increasing number of fast trains, and the expenditure in stabilisation found to be amply justified.

* * * *

The Institution of Civil Engineers

We have recorded in our news columns the death, at the early age of 60, of Dr. Jeffcott, the Secretary of the Institution of Civil Engineers. Prolonged illness had prevented him latterly from taking any active part in the direction of the institution affairs. His predecessor, Dr. Tudsbery, happily still alive, is Honorary Secretary to the Institution. Under an earlier Secretary, James Forrest, by many still remembered, the institution grew to its commanding position in the engineering world. The premier engineering society has had few secretaries, and now a successor has to be sought to Dr. Jeffcott. It is an important position, and the occupant of such a post can exercise a strong influence both upon the future of the institution itself and upon the engineering profession at large. He should therefore be chosen carefully, and we would venture to suggest to the Council that it has both a grave duty and a great opportunity. The appointment is naturally regarded somewhat as a "plum" by the engineering profession, and it should therefore be thrown open to the membership of the institution as a whole, but not outside, for if the best man cannot be found within its own ranks, it is indeed in a poor way. No doubt the council is already carefully reviewing the qualities it requires, and what function its Secretary should fulfil. Energy, initiative, and tact are essential, but we suggest that a man is needed who should not immerse himself in administrative detail, but who should be free to think out the best methods of implementing the institution's policy so that it may be

guided, under the direction of the council, for the benefit of the engineering profession and the community at large.

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National Search for Scrap Metal

An intensive search for "old iron" is to be made all over Great Britain, for the present record steel output has created such a shortage of raw material that British manufacturers are to co-operate with the scrap iron and steel merchants in an appeal for old iron from households, farms, and estates and works up and down the country. In the announcement of the scheme made last week by the British Iron and Steel Federation, it was pointed out that an "incalculable but certainly enormous tonnage of scrap is believed to be lying idle." It was felt, therefore, that at a time when steel outputs were exceeding all records, it was highly desirable that this store house of an essential raw material be regularly cleared; the result meant a net addition to national prosperity. The public, manufacturers, and traders will be asked in the national interest to increase the flow of scrap iron to steel works through the existing channels. The regular use of scrap in steel-making implies the conservation of coal and iron ore resources, and an appeal is to be made to avoid wastage through loss or oversight of a raw material upon which one of the country's largest industries depends. Old iron, relegated as lumber, rubbish, or refuse, represents the ultimate equivalent of over 90 per cent. finished steel. Last year over 3,000,000 tons of scrap were bought on the British market, compared with about 1,000,000 tons imported.

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Cables for Signal Work

The signal engineer in these days of constant extensions of power and automatic signalling, often side by side with electric traction, has perhaps more reasons than most for requiring electric cables to be well manufactured and perform their work without failure during a reasonably long life. The grave consequences, to say nothing of traffic delays, that might result from unsatisfactory cable and wiring equipment, in spite of various cross-protection precautions, make it imperative that the signal engineer shall have the best that the cable maker can give him. This involves exacting conditions, as cabling and wiring are subject to considerable vibration from passing traffic and often having to cross the permanent way, with the attendant disadvantages. Mr. E. A. Bayles, A.M.I.E.E., in an interesting informal talk to the Institution of Railway Signal Engineers recently, dealt with certain features of rubber-insulated cables, and intimated that many important questions were still receiving the active attention of cable manufacturers. They have already accomplished remarkable work, but further research is still required.

* * * *

Permanent Way

The annual summer convention of the Permanent Way Institution which was concluded yesterday at Southport is a reminder of the increasing importance of the permanent way with the growing tendency to the higher speeds and heavier vehicles that run over it. Those who participated both in the test runs of last November between Euston and Glasgow and the trial trips of the Coronation Scot between Euston and Crewe last week could hardly fail to notice the improvement in the track that has been effected in the intervening seven months. It is true the running was good in the former tests, but many more speed restrictions had to be observed. In the Coronation Scot trials, however, although speed restrictions were both less numerous and less severe, the running was even smoother, a fact confirmed by the Hallade records. What has happened is that a consistent attack has been made right along the line, and during the period over 100 curves have been adjusted for cant and alignment with a maximum slue of only 18 in. Not only so, but the greater attention paid to ordinary maintenance, aided by the introduction of measured shovel packing (see pages 65-67), has made its contribution to the notable result achieved.

* * * *

Measuring

When in 1908 the old London & North Western Railway introduced the method of shovel packing to maintain the true level of the track, a revolution was instituted, for that is the method now standard on many railways in various parts of the world, and its use is spreading still. The L.N.W.R. method left to the judgment of the platelayers the amount of fine ballast required to be placed under the sleepers to restore any particular deficiency in level, and the men soon became skilled in doing the job properly. When, many years later, the French adopted shovel packing, they decided that it would be advisable to measure the required amount of chippings exactly, and it was M. Lemaire of the Nord who devised the first system of measured shovel packing. This was, of course, to have been expected, for it is typical of the French to bring mechanical means to the aid of human judgment, just as it is typical of the British to avoid doing so as long as possible. The provision on French locomotives, for example, of speed indicators and automatic recorders obviates the necessity for the use of judgment in the observance of speed restrictions, whereas in this country we have hitherto relied entirely on the unaided judgment of the enginemen for this purpose. Now, with the tendency to higher speeds, we are at last beginning to equip our locomotives with speed indicators; and similarly, in regard to shovel packing, measurement is being adopted. On another page of this issue we describe the method of measured shovel packing which is now being introduced on a considerable scale on the L.M.S.R.

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Another New Locomotive Development

Evidently the Pennsylvania development upon which we commented on page 1191 of our issue of June 25, has been to some extent anticipated by its competitor the Baltimore & Ohio Railroad, which has recently completed at the Mountclare works a 4-4-4-4 type passenger engine, similar in principle to the 4-4-4-6 now under construction for the Pennsylvania. The new Baltimore & Ohio locomotive has been designed by Mr. W. B. Whitsitt, Assistant Chief of Motive Power and Equipment, and named *George H. Emerson* in honour of the present Chief of the department. The novel feature of the engine, like that of the Pennsylvania design, is the independently driven pairs of 6 ft. 4 in. four-coupled wheels, as may be seen in our illustration on page 70. The cylinders are each 18 in. × 26½ in. with 10-in. double-ported piston valves, and all take steam direct from the boiler at 350 lb. pressure. The total heating surface is 4,897 sq. ft., including 670 sq. ft. of firebox area, and in addition to a superheater of 1,312 sq. ft. The firebox, which has a grate area of 80·5 sq. ft., is of the Emerson water-tube type. In working order the engine weighs 193 long tons, of which 119 tons rest on the eight driving wheels. The large 12-wheeled tender, holding 20 long tons of coal and 18,000 gal. (British) of water, is fitted with a water scoop. It is said that since this engine was completed it has more than fulfilled expectations in road tests.

High Speed—An Advertising Asset

THIS Coronation year will be looked back on as one which has given a greater fillip to British railway speed than any year since 1932. It was in May, 1932, that the tradition, which had persisted since the 1895 Race to Aberdeen, of running no day train between London and Edinburgh, or London and Glasgow, in less than 8¼ hr., was brought to an end; by July of that year the non-stop Scotsman was running between King's Cross and Edinburgh in 7½ hr.; and by July, 1937, the time has come down to 7 hr. Far more striking, however, is the fact that July 5, 1937, witnessed the first occasion since August 27, 1895, on which the record London-Edinburgh time of 6 hr. 19 min., which has stood for nearly 42 years, has been broken; and now the permanent daily journey of the L.N.E.R. Coronation is all but 20 min. less than the 1895 record. Furthermore, in comparison with the undoubted risks that were taken in the negotiation of curves in the 1895 race, let alone what must have been the acute discomfort of passengers in the trains, the 1937 running is accomplished with a smooth running train three times the weight of that of 1895, and in which almost every reminder to the passenger that he is travelling at high speed, other than the moving panorama from the windows, has been eliminated. So, in just over five years, the best day times between London and Edinburgh have been cut by 2¼ hr. from 8¼ to 6 hr.—a remarkable acceleration—just as those of the L.M.S.R. between Euston and Glasgow have been cut by the new Coronation Scot from 8¼ to 6½ hr.

The trial runs of these two trains, fully reported in the July 2 issue of THE RAILWAY GAZETTE, added fresh laurels to the British locomotive designer, and proved that, with the aid of the internal streamlining that has been developed by study of steam flow in the locomotive, and even more important in its influence on the running than the external streamlining, steam raised by our own indigenous fuel may still be relied on, not merely for extremely high maximum speeds, but also for high speeds sustained over long distances. Such a feat, for example, as that of the L.M.S.R. Coronation Scot in covering the 150¼ miles from Betley Road to Kilburn at an average speed of 83·3 m.p.h., inclusive of severe slowings through Stafford and Rugby, has had no previous parallel in this country; and although the average of 89.1 m.p.h. over the 69.9 miles from Welton to Willesden did not quite equal the 91.8 miles of the L.N.E.R. Silver Jubilee from Wood Green to Fletton on September 27, 1935, it was achieved with a load of 270 tons as compared with the latter's 220 tons. Again, the trial runs showed the ability of the latest locomotives of both companies to reach without difficulty a three-figure maximum in speed; had the gradient from Whitmore towards Crewe been longer, it is probable that an even higher record than 113 or 114 m.p.h. would have been reached, just as the L.N.E.R. 109 m.p.h. of the following day would almost certainly have been higher with a lighter load than 320 tons on a longer grade. It will be recalled that 113 m.p.h was reached by the latter company with a 270-ton train on September 27, 1936; and the speed honours may now be regarded as resting evenly between the two companies.

It must not be supposed, moreover, that such performances are without their value. Record journeys of aircraft, racing motorcars, and ocean-going liners, have all had a profound influence on design; and it is beyond dispute that the movement towards considerably higher speeds on railways has not only resulted in increased capacity for sustained high speed, but has increased thermal efficiency at the same time, to such a degree as will ultimately benefit all classes of locomotive. Similarly the psychological effect on railway staffs of the presence on the line of these high speed trains is considerable. The fact that they must not in any circumstances be delayed smartens up the working of other services whose irregular running might react upon the flyers; engine-crews that work the high speed trains can hardly resist the urge to import equal vigour into the working of other services which come within their weekly rosters; the increased vigilance in signalling and other details of operation which must necessarily accompany high speed working is obviously likely to increase the safety of railway operation as a whole. And, lastly, the spectacular in railway achievement, such as the appearance, the speed, and the comfort of these streamlined trains, cannot be despised in the influence that it exercises on the mind of the public. Public patronage is, after all, the only sure foundation on which these developments of railway enterprise can be built; and we are convinced that high speed service of this description, in the attention that it directs to the combination of speed, safety, and comfort afforded by modern railway travel, will prove to be well worth while.

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Northern Railway of France

FOR the greater part of the year 1936 the same conditions prevailed as had operated for some years past to diminish traffic on the Northern Railway of France, and these were aggravated by industrial unrest in certain quarters. In the second half of the year, however, there were signs of more confidence in the business world. A similar improvement in industry also showed itself during the last six months of the year on the Nord—Belge system —controlled by the Nord—which has lines 170 km. in length serving Liége, Namur, Dinant, and Charleroi. Gross receipts in 1936 on the French system of 3,830 km. were higher by fr. 29,854,567, but working expenses were affected during part of the year by the new social legislation and increased by fr. 31,085,939 in comparison with 1935. A larger allowance (fr. 58,699,503 against fr. 56,441,434) in respect of Ceinture working reduces this increase to fr. 28,827,870. The result of the year's operations on the Nord system in France in 1935 has been that after providing for all outgoings, including capital charges of fr. 572,326,936, there is a deficit requiring a claim of fr. 598,964,203 from the Common Fund, compared with fr. 600,836,543 in 1935. The dividend for 1936 is fr. 70 on each fr. 400 ordinary share, the same as for 1935, and it is provided as to fr. 19.714 a share from the profits of the property account (*domaine privé*) which amounted in 1936 to fr. 12,746,966. From the Nord—Belge lines in 1936 a working profit of 17,609,647 Belgian francs was realised, but the net deficit was 15,065,046 Belgian francs. To the partial reduction of this deficit the sum of French fr. 2,397,116 (balance after allocation of fr. 10,349,850 to dividend) has been appropriated from property account. The Brussels Appeal Court gave judgment on July 14, 1936, dismissing the company's appeal against the decision of the Belgian Court of first instance that the Namur—Liége concession expires on September 4, 1941, and not in 1953. The chief points in the case were discussed in THE RAILWAY GAZETTE of October 13, 1933.

The number of passengers carried on the French system in 1936 was 1.2 per cent. lower than in 1935. Generally speaking, international and interior traffic was slightly less, but Anglo-French traffic improved considerably on the slight advance shown in 1935, partly because of the great success of the Dover-Dunkerque ferry service. The institution of holidays with pay has also brought a new

traffic, and railcars continue to grow in popularity. Third class travel continues to increase at the expense of the two higher classes. The respective percentages of first and second class receipts to the total passenger receipts were 6.86 and 22.23 in 1936, against 7.37 and 23.16 in 1935. Goods traffic was more encouraging than in 1935. *Petite vitesse* tonnage shows an increase of 5.1 per cent., the traffic in *petits colis* gives even better results than before, and the use of containers grows steadily. Goods traffic receipts are now classified under one heading *marchandises*. Figures in the accompanying table refer to operations in France:—

	1936	1935
Total train-kilometres	57,188,344	54,631,296
Operating ratio, per cent.	101·65	101·75
Passengers	117,958,505	119,366,362
Tons (*Charges complètes*)	46,341,395	44,378,887
Average haul, km.	131·5	130·9
	Francs	Francs
Passenger receipts	385,891,633	392,673,275
Goods traffic receipts	1,159,277,461	1,121,947,833
Gross receipts	1,609,612,188	1,579,757,621
Working expenses	1,636,216,909	1,607,389,039
Loss on working	26,604,721	27,631,418

To the fr. 26,604,721 loss on working has to be added the ⅓ share (fr. 29,415,329) due to the State Railways from the operation of the Amiens—Rouen line. On the other hand, the *prélèvement* of 10 per cent. under the laws of July 16, 1935, and June 20, 1936, amounts to fr. 45,305,916, and gives net receipts of fr. 15,890,587. Allowing for the prélèvement the operating ratio for 1936 was 98.84 per cent.

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Leopoldina Railway

AN increase of 12·41 per cent. in the gross sterling receipts of the Leopoldina Railway for the year 1936 was partly counterbalanced by an increase of 8·04 per cent. in working expenses and by differences in exchange which cost the company £3,812, comparing with a credit of £28,157 in 1935. Revision of tariffs brought about an increase of 26·18 per cent. in passenger receipts, although the number of passengers was 14.85 per cent. less due to competition from short-distance omnibus services. Goods and livestock tonnage improved by 13·81 per cent., but the receipts therefrom by only 7·77 per cent. The average haul (96·04 miles) was about the same, and although the quantity of high class goods was greater, the revenue per ton was lower because of rate reductions made to offset competition, and also because a large proportion of coffee traffic—the 30 per cent. sacrifice quota—was only hauled very short distances to the nearest storage sheds of the National Coffee Department. In the current year cotton traffic, which bears a remunerative rate, is likely to be exceptionally heavy. The chief cause of the increase in working expenses was the operation of the eight-hour law and weekly day of rest, although fuel costs were also higher.

	1936	1935
Passengers	24,931,124	29,278,287
Goods and livestock, tons	1,984,858	1,744,084
Operating ratio, per cent.	87·75	91·30
	£	£
Passenger receipts	288,200	228,397
Goods and livestock receipts	654,452	607,241
Gross receipts	1,049,224	933,412
Working expenses	920,728	852,172
Net receipts	128,496	81,240

After allowing for prior charges, etc., there is a debit balance of £189,919 on the year's working.

Short-Wheelbase Vehicles

IT has been increasingly realised during the last few years that the railways possess a valuable asset in being able to offer high-speed transport combined with an exceptional degree of safety. Acceleration, however, can serve its purpose only when safety is not imperilled. Within the last year or two there have been some disquieting derailments, not indeed of well-known high-speed trains, which have been immune from serious mishap, but of 4-wheeled short-wheelbase vehicles, such as horse-boxes and perishable vans, attached to passenger trains which attain fairly high speeds at certain parts of the journey. The consequences of these derailments have fortunately, from the public point of view, not been particularly serious, but they easily might have been, as is instanced in the latest case, that at Barford, L.N.E.R. on March 18, which was inquired into by Lt.-Colonel A. H. L. Mount, whose report is summarised on page 78 in this issue. The derailed van, the last vehicle of an up train, became uncoupled after leaving the rails, and stopped just foul of the down main line, where it was struck by a sleeping car express travelling at about 70 m.p.h. It was fortunately thrown clear, but woodwork penetrated the engine cab and fatally injured the driver. It is easy to see that such derailments constitute a serious menace to the safety, not only of the trains to which the vehicles are attached but to others also.

It has, of course, been recognised for a long time that it is undesirable for these vehicles to run at very high speeds, and the companies have been extending the list of trains to which these must not be attached, while special instructions are given covering their marshalling in others, so that they shall be placed in the rear of bogie vehicles carrying passengers, unless that is impracticable. In some of the cases inquired into of recent years, small track inequalities have been considered to have played a part, but as these are always liable to exist to some extent the problem of dealing with the risks associated with short wheelbase vehicles is the more urgent. The results of Hallade tests, made at Colonel Mount's request between London and Peterborough, and a comparison between the diagrams published in his report, prove how extensive the oscillation can become, so that no great amount of additional influence is needed to produce a critical condition. The railways rely on conveying certain classes of goods in vans attached to passenger trains to enable them effectively to meet road competition, and limitations imposed by siding turntables and other accommodation make it necessary to use a considerable number of the short-wheelbase type.

The only practicable course at present therefore is, in Colonel Mount's opinion, strictly to limit the maximum speed of the trains concerned, and he recommends that, without further delay, the operation of 4-wheeled freight stock under 15 ft. wheelbase should be restricted to 60 m.p.h. at any point of the journey. At the same time, he thinks, the use of such stock should be limited to meet only the most essential commercial needs, and tests might be made to ascertain more accurately the effect of speed, particularly in respect of incidence and amount of side pressure between flange and rail. Thus the short wheelbase 4-wheeled vehicle, a legacy from the early days of the railway, as are the small turntables and inconvenient sidings above mentioned, is proving a hindrance to the development of the railway companies' best asset, high speed with safety. The whole question calls for a far-seeing investigation with the object of getting rid, once and for all, of something which must inevitably bring a certain measure of anxiety, whatever regulations may be made about it.

LETTERS TO THE EDITOR

(The Editor is not responsible for the opinions of correspondents)

Golders Green: A Tube-Made District

198, St. Helen's Road,
Hastings, Sussex
June 28

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—Your editorial in the issue of June 25 reminds me forcibly of the ejaculation of a City man who was certainly not a lover of new suburbia. "Golders Green?" he quoth, "Bah! Forty years ago it wasn't thought of, now its *unthinkable!*"

Yours faithfully,
R. A. H. WEIGHT

Penny Wise Pound Foolish

1, Carlton Mansions,
West End Lane, N.W.6
July 2

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—There is much force in Mr. G. Davies' letter in your issue of June 18. It seems to me, and I have more than once written to the railway people about it, that there is a way to increase revenue without increasing fares, viz: If first class fares were reduced and standardised at 25 per cent. instead of the present 50 per cent. above the corresponding third class fares, then a large increase in first class passengers and revenue would follow. Also, owing to the consequent decreased demand for third class accommodation, it is probable that a reduction in the weight of the trains could be effected. A similar scheme could be applied to the cheap Sunday and other excursions, whereby increased revenue could be obtained by the provision of limited first class accommodation. The railways risked the experiment of summer tickets and the result was satisfactory. I suggest they take another risk from October 1 for six months by introducing reduced first class fares on the basis suggested. This facility would attract many, whereas at present first class travel is an attraction to but a few. If this is tried then the first sleepers should be increased to 21s. for England and 25s. between England and Scotland and *vice versa*, as the first sleepers are vastly superior to the third sleepers—a contrast not so evident between ordinary first and third day accommodation.

Yours faithfully,
W. WRIGHT

Benefiting the Passenger

56, St. Mary's Mansions,
Paddington, W.2
July 5

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—Although everyone welcomes the new 6-hr. and 6½-hr. trains to Edinburgh and Glasgow, there are certain aspects of their timetable arrangement which ought, I think, to be emphasised at once—not by way of complaint, but in the hope that second thoughts may extend the advantages offered to the travelling public. The L.N.E.R. Coronation is the first *new* high-speed service to figure in our timetables, and naturally we hope that its sponsors will be rewarded by a satisfactory regular loading, when the novelty of the 6-hr. schedule has worn off, and the tourist season is over.

Both groups have recently stressed the point that these trains are not competitive, and both aim at giving the public the widest possible benefit from faster travel. Indeed, the first accelerations of the Anglo-Scottish service in 1932 were largely aimed at dispelling the idea that co-operation between groups would tend to worsen train services—which, assuredly, it has not done. But the public is being placed in rather an unenviable position if, on the one hand, interavailability of tickets checks the provision of better facilities between what were "competitive" points (for fear lest the pioneer may find himself carrying somebody else's traffic) and, on the other, a desire to avoid any possible charge of piracy limits the area which a new train could serve. Why should the fact that the L.M.S.R. runs a 6½-hr. London and Glasgow train at 1.30 deprive Glasgow passengers of a service later in the day on the Coronation via Edinburgh (especially on the down journey, where the York stop gives passengers from Leeds to Scotland a substitute for the pre-war 1.30 from St. Pancras, which carried a considerable Glasgow traffic from Yorkshire), and why—an item already referred to in your columns—should not passengers in the 11.5 a.m. from Inverness, due at Perth at 2.56 p.m. have a new service to London on the 4.30 from Edinburgh?

The situation is made more curious by the fact that the improvements made by one group, with much flourish of trumpets and extra mileage, often merely duplicate facilities already provided by another. In May, 1936, for instance, a better afternoon service was arranged from Euston to Perth in 9 hr. 28 min. (it is now 9 hr. 5 min.) instead of 10 hr. 40 min., although the L.N.E.R. already gave an afternoon service in 9 hr. 38 min.; now, at long last, the 10.5 a.m. from Aberdeen and the 8.30 (no longer 8.35) from Inverness reach Euston at 9.30 p.m. instead of 10.40, when an arrival at King's Cross at 9.35 was already in existence from all vital points. And a suspicion that the train arrangements of one group are not always adequately appreciated on the other is increased by study of the joint train-service posters and by certain connectional hardships—to some of which your correspondence columns have already borne witness. In October, 1936, for example, the 10 a.m. from King's Cross was accelerated to reach York at 1.15, but it was not until the spring of 1937 that the 10.45 from Liverpool to Newcastle (which takes forward, from York, London traffic for the Darlington area) was altered to leave York at 1.36 instead of 1.55.

The L.M.S.R. 6½-hr. Euston and Glasgow train, though on rather a different plane as regards appointments, speed, and supplement from the L.N.E.R. Coronation, breaks new ground—in the matter of extra fare—by compelling Glasgow passengers, hitherto carried without supplement, to pay the compulsory registration fee—small though it is, especially when the ordinary seat reservation charge is deducted. All other extra fare trains in Great Britain have hitherto been "new," or covered by ordinary services, and experience may show that the timetable devices, which bar through passengers from using the following "ordinary" train, are unnecessary in this case. The Coronation Scot, by its Carlisle stops, has virtually restored (for London passengers) the pre-war 1.30 service from St. Pancras to the former Glasgow and South Western line, and the corresponding pre-war 8.15 arrival at St. Pancras, but although on the up journey it offers a 10 hr. 25 min. service from Aberdeen to London, with 55 min. for crossing Glasgow, it gives no down service to the north—could not the 7.15 p.m. from Glasgow, now close on the heels of the 5.0 and 6.8 services, have been accelerated, and even started from the Central station at about 8.10? And the widely advertised improvements from Lancashire to Scotland are disappointing. The Manchester to Glasgow evening journey time only reverts to the 5 hr. 10 min. of May, 1936 (from which it was afterwards worsened to 5½ hr. and, latterly, 5 hr. 20 min.) as against a pre-war 5 hr. 5 min., and the only material gain (on which press notices seem to be silent) is in the old 3.5 from Manchester, which is now lifted clear in front of the Coronation Scot and the group of trains that precede it, and thereby gains 37 min. on the Manchester—Glasgow journey, now restored to a 5 hr. 18 min. schedule as against a pre-war 5 hr. 20 min.

Yours, &c.,
R. E. CHARLEWOOD

PUBLICATIONS RECEIVED

On Either Side. London: The London & North Eastern Railway. 9 in. × 8¼ in. (9 in. × 4⅛ in. folded). 75 pp., with map of system. Illustrated.—The 1937 edition of this useful publication is attractively got up on imitation art paper with a bright coloured wrapper. In addition to showing the traveller, by means of continuous maps, his route from King's Cross to Edinburgh, and thence to Glasgow and Mallaig, Inverness via Aberdeen, and Inverness via the L.M.S.R. line through Dunkeld, the pages carry short descriptive paragraphs and half-tone illustrations of scenes along the route. Some of these reproductions, though small, are very fine, particularly the views of Grantham and of the Tyne road bridge. It is a pity, however, that the compilers did not select a view of York Minster, with its beautiful central tower free of scaffolding. The booklet is invaluable to the intelligent passenger, who does not know the road, and yet wants to catch all the worth-while glimpses.

The Track of the Coronation Scot. London: The London Midland & Scottish Railway, Euston, N.W.1. 9¼ in. × 4¼ in. 28 pp., with introduction by Edmund Vale.—This is an attractive little "running commentary," for so it describes itself, on the progress of one of Britain's latest trains across the varied face of England and Southern Scotland. We are introduced to it by one who has a very wide knowledge of British social, architectural, and natural history. The plan of the track carries us, page by page, from Euston to Glasgow Central, and marginal notes tell us what to look out for on each side of the train. The compiler of those notes is clearly a person of wide observation and catholic interest. Camden running sheds and the five-sailed windmill near Nuneaton come in for impartial mention, like many other things. Printing and production are excellent, and the booklet, unlike some publications of this kind, is anything but cumbersome.

The Coronation and other famous L.N.E.R. trains. By Cecil J. Allen. London: Ivor Nicholson and Watson, Paternoster Row, E.C.4. 7¼ in. × 4⅞ in. 176 pp. Illustrated. Price 1s. net.—We have advanced a long way from the days when passengers were not encouraged to take any interest in the trains they used. Mr. Allen, both as a London & North Eastern man and as a popular writer on railway subjects, is surely qualified to give us the story of The Coronation train, its predecessors, and its contemporaries. Under the author's guidance, the layman, and his son for that matter, learns something of the development, through successive generations, of "Flying Scotsmen," which has led up to the introduction, first of the Silver Jubilee, and now of the Coronation. Not only locomotives and rolling stock, and the performance of the former, receive attention; the East Coast route with its magnificent series of bridges, and the Signalling and Permanent Way Departments, both come in for their full share of description. The ninth, tenth, and eleventh chapters graphically describe the run from London to York, its continuation from York to Edinburgh, and thirdly, a footplate ride on one of the new streamlined locomotives. The author has an easy, and at times racy style, well-known to many and well suited to this class of work, though there are certain *clichés* which he might have avoided. The half-tone illustrations are numerous and excellent; they include several really beautiful shots. Altogether, Mr. Allen has produced a most attractive and instructive little book, a worthy successor to the well-known booklet on the Flying Scotsman.

Die optische Zugbeeinflussung auf der Strecke Berlin-Stettin (The Optical A.T.C. Apparatus on the Berlin-Stettin Line). By Dipl.-Ing. F. Hofmann, of the Reichsbahn Central Technical Offices, Munich. 19 pages, 8¼ in. × 11¾ in. 36 figs., including 17 photographs. Reprinted from the *Zeitschrift für das gesamte Eisenbahn-Sicherungs- und Fernmeldewesen*, Nos. 3, 4, and 5 of 1937. Published by Dr. A. Tetzlaff, Herderstrasse 14, Zehlendorf, Berlin.—In our issues of September 7, 1934, and May 1, 1936, full details were given of the inductive A.T.C. apparatus in use on a number of main line sections of the German State Railway. Two other methods of enforcing attention to signals are also in use on that system to some extent, one being the ordinary automatic stop mechanism, or *Fahrsperre*, applied to a number of signals on the Berlin city and local lines where electric trains run, and performing the same functions as the train stops on the London Underground. The other is the optical A.T.C. equipment, invented by Dr. W. Bäseler, a Reichsbahn officer in charge of experimental work at Munich, and installed at certain signals between Berlin and Stettin and a few other points, as well as on a number of locomotives. In this publication Herr Hofmann gives a very complete account of the principles of this apparatus, the construction of its chief parts, the technical working programme, and the means used to realise it under varying conditions, all of which impresses on the reader the amount of ingenuity which has been applied to the development of Dr. Bäseler's original idea. Distant signal vigilance handle action, continuous and intermittent speed control, speed control for temporary restrictions and permanent way slacks, and absolute stop action are all covered. The mechanisms used are quite unlike anything else seen in this field, which gives an added interest to Herr Hofmann's instructive and clearly written account. The illustrations are well chosen and the publication is, as is usual with reprints from Dr. Tetzlaff's journal, excellently produced on art paper. Whether optical train control will be permanently adopted on this or other sections of the Reichsbahn remains, of course, to be seen.

Shadrach, Meshach, and Abednego.—We have received from Head, Wrightson & Co. Ltd. a catalogue of three types of heat-resisting steels, known respectively as Shadrach, Meshach, and Abednego. The Abednego grade is an austenitic chromium nickel alloy of high strength and ductility, which is also well adapted to withstand oxidation, erosion, and corrosion at temperatures up to 1,150° C. Shadrach and Meshach are high chromium nickel-free heat-resisting alloys, with additional elements introduced to increase their load-sustaining capacity.

Machine Vises.—A list of XL and NL type vises for milling, planing, shaping, and drilling machines reaches us from J. Parkinson & Son, Shipley, Yorks. A special range of tool makers' or milling machine vises is also shown, having jaw plates made from chrome crucible cast steel, oil-hardened and ground. The NL vises are designed so that the work is firmly held and does not lift when pressure is applied. A similar effect is obtained in the XL types by the use of retiring or pull-down jaws, which move downwards under pressure. The XL and tool makers' vises are obtainable with swivel bases, graduated in degrees.

Aluminium Welding.—The second of a new series of technical information booklets now being issued by the British Oxygen Co. Ltd., Thames House, Millbank, London, S.W.1, deals with the welding of aluminium by means of Alda rods. These rods are obtainable composed of about 99·5 per cent. pure aluminium, or alloyed with silicon or copper in various proportions. After discussing the characteristics of the different types, the booklet proceeds to give practical instructions on welding methods and procedure, with diagrams of leftward and upward manipulation. The illustrations show examples of welded aluminium ranging from table ware to chemical distillation columns.

An Adjustable Sash Balance.—Beckett, Laycock & Watkinson Limited, Acton Lane, London, N.W.10, send a folder illustrating and describing the Beclawat adjustable spring-controlled sash balance. This device consists of a steel tape for attachment at one end to the sash of the window, and at the other end wound round a drum inside a neat pressed steel casing. Rotation of the drum is controlled by a flat coil spring attached to its spindle, and the tension of this spring is adjustable by means of a key. When the correct tension to balance the weight of the sash is attained, the adjustment is automatically locked. This sash balance is equipped with brackets whereby it can be mounted in almost any position. All steel parts are rustproofed, and the mechanism, which is totally enclosed, is packed with grease.

THE SCRAP HEAP

Season contract tickets were in use on the Clyde steamers in 1816 and are not, as is often supposed, a comparatively modern innovation of the railway companies.

* * *

When on July 2 a man was charged at Croydon with stealing a towel worth sixpence from a Southern Railway train, an official of the company said that there was an average loss of 40,000 towels a year.

* * *

OLD IRON

The following recent letter to *The Times* has a new topical interest in view of the national appeal for scrap iron to which we refer in an editorial note on page 51 :—

Before you close the correspondence on the subject of railings round London squares attention should be drawn to the crux of the whole matter. The iron railings for which English towns are remarkable are one item in a great legacy of real wealth left by our forebears to this unhappy generation now feverishly preparing to burst its inheritance in a final war. The railings should surely be preserved until the present shortage of scrap iron becomes more serious.

* * *

A missing cat mystery was cleared up in the United States recently, when a trunk was opened after a two-day railway express trip—the cat jumped out of the trunk, none the worse for its experience. The cat had disappeared from its owners' home at Great Neck, New York, the day the expressman arrived to collect a trunk in which their belongings had been packed for a trip to Chatham, Mass., and had finally been given up as lost.

THE UBIQUITOUS ENGINE WHISTLE

To many enthusiasts the sound of a locomotive whistle (at not too close quarters) is as sweet music to their ears, but few would have dreamed of the unexpected possibilities of distant transmission of their favourite shrill emissions which broadcasting has produced. Recently during a pre-lunch quarter of an hour's commentary by Mr. Howard Marshall from Lord's Cricket Ground, a sonorous Great Central whistle was distinctly heard which reminded us that the Marylebone main-line of the L.N.E.R. enters a tunnel near by and runs beneath part of the property of the M.C.C. A week or so later the same broadcaster was describing to listeners at the same hour of the day details of the play at Horsham, when wafted amid his words and the crack of bat and ball came the toot obviously sounded by the whistle from an L.B.S.C. "push-and-pull" tank engine on the Southern Railway. After a few minutes only, the transmission was shifted to Cardiff where Mr. P. G. H. Fender was waiting to tell a listening world how the Glamorganshire team was faring when, lo! and behold, again came the engine whistle's shriek from the loud speaker; this time, of course, it was the typical Great Western locomotive call!

* * *

HESSE RAILWAY JUBILEE

In April, 1912, the Hesse Railway Company was established at Darmstadt by agreement between that city and the South German Railway Company to absorb the electric tramways of the former (opened in 1897), and the steam tramways belonging to the latter running out to Griesheim, Eberstadt, and Arheilgen. The new concern bought the city electricity works. The capital was 4 million marks, subscribed nearly equally by the two partners, with a small sum from the province of Starkenburg. A beginning was made before the war with electrifying the steam lines and extending the city tramway routes. In spite of the war traffic improved considerably for a time until the depression and road competition affected it. Alterations in fares and other measures stemmed the tide, and bus feeder services were introduced. New lines in the city suburbs have been built, so that, inclusive of bus services, the route mileage is now 32. The company owns 61 motor, 49 trailer cars, 16 buses, and 28 other vehicles. At the end of 1936 756 persons were employed. In that year passengers carried increased 1.89 per cent., amounting to 11,290,000. Receipts, which rose 3.83 per cent. in 1935, again increased by 4.89 per cent. The year closed with a net profit of 1,010,000 RM., and a dividend of 10 per cent. has been distributed. The company has issued a book to commemorate its 25 years of working.

* * *

The victim of a motorcar crash in the United States recently was saved from almost certain death by the quick action of a Southern Pacific train crew. While driving in a blinding rain, the motorist ran off the road, his car overturned, and he was rendered unconscious. The crew of a passing train stopped, backed, picked up the injured man, and took him to the next station, from which point he was rushed to a hospital by motorcar. The attending surgeon said an artery had been cut and the man would undoubtedly have died but for the prompt and intelligent action of the train crew.

One Hundred Years Ago

Extracts from the July, 1837, issue of "The Railway Magazine" (afterwards "Herapath's Railway Journal") and the oldest constituent of THE RAILWAY GAZETTE

Great Western Railway.—About half the entire line between London and Bristol (or nearly 60 miles) is now under contract, and in process of construction. This comprises the whole distance between Paddington and Reading at the eastern end, and between Bristol and Bath at the other, with a portion of the line on the western side of Chippenham, for which the directors have recently concluded a contract on very satisfactory terms. This contract includes the heaviest work upon the line, and it will form the limit in point of time to the completion of the undertaking.

Brighton Railways.—The rival companies have at length seen it their interest to endeavour to form a union. We believe we are correct in saying, nothing is yet definitively (*sic*) settled to the satisfaction of *all*, though there is great probability matters will be amicably arranged. How often have we urged this, and how often has it been proposed by one of the parties—Mill's Committee! It ought to have been done twelve months since.

Grand Junction Railway.—This railway will be opened from Newton to Birmingham on Tuesday, the 4th of July next, forming, with North Union Railway, a complete railway communication from Preston to Birmingham. A very interesting trip was lately made over this line . . . . The opening of this line has been looked forward to by all classes, as likely to prove the touchstone of railway speculations. This is one of the great lines (or indeed we believe the only one) which has been completed within the estimate, much to the credit of the engineer and directors, and still more, to the satisfaction of the shareholders.

Llanelly Railway and Dock.—Three miles of this line are already completed and brought into profitable operation, which, together with the pre-existing two miles, have enabled the company to declare their first dividend, on the profits of the concern, of six per cent. per annum.

Bed Carriages.—Among other conveniences provided by the directors of the Grand Junction Railway for the accommodation of travellers, not the least amusing (and useful) one is a species of conveyance named in the advertisement, "bed carriages in a mail-coach!" In other days the man who would have talked of living to see the time when he could *sleep in bed* and be carried through the air at the rate of thirty, or five-and-thirty miles an hour, would have been deemed a suitable inmate for a lunatic asylum.

OVERSEAS RAILWAY AFFAIRS

(From our special correspondents)

ARGENTINA

Railcar Control by Wireless

The Government has authorised the State Railways administration to erect two wireless stations at Buenos Aires and San Antonia Oeste (Rio Negro territory), respectively, for the purpose of establishing communication with the new railcars which were recently put into service on the Patagones-Nahuel Huapi line, and which will be equipped with wireless receiving sets. These stations will be under the supervision and control of the Director-General of Posts and Telegraphs, and will be subject to the usual charge of $500 paper per annum each, levied on all private wireless stations. The service, which is provisional, has been established to exercise better control over the running of the railcars in the southern territories.

Transportation Co-ordination Committee : Election of Representatives

The regulations for the election of the representatives of the railways and the road transport concerns on the above committee have been issued by the Ministry of Public Works in the form of a lengthy Decree, the principal provisions being as follows:—

Within 30 days of the holding of the elections, the electoral council shall forward to the railways and road motor companies the necessary forms, for the purpose of supplying the title and domicile of the company in question, and the name of its selected delegate. In addition to this information, each road transport concern must also furnish particulars of the route of the line or lines which it operates, and the number of vehicles it has in service.

Each road transport company will have the right to one vote for each vehicle in its possession. The road transport companies may nominate one delegate for several companies, but no delegate may represent more than 10 companies.

Each railway will have the right to one vote for each million tons of goods carried over a distance of one km., the average for the last five years to be taken as a basis. No railway delegate may represent more than three companies.

The first electoral council will be composed of the Chairman of the National Roads Board, the General Manager of the State Railways, the Director of Navigation and Ports, and the Director-General of Railways, and will be presided over by the Minister of Public Works.

New Buenos Aires—Mendoza Express Service

Among other improvements and accelerations incorporated in the new winter timetable of the B.A.P.R. is the introduction of a bi-weekly day express service between Buenos Aires and Mendoza and vice-versa—named El Cuyano after the Cuyo Provinces of Mendoza and San Juan which it serves—composed of Pullman and dining cars, and first and second class coaches. The journey between these cities (1,063 km.) is covered at an overall average speed of 42½ m.p.h. in 15 hr. 20 min., instead of the ordinary schedule of 22 hr. On the outward journey, the train leaves Buenos Aires on Sundays and Thursdays at 7.45 a.m., arriving at Mendoza at 11.30 p.m. On the return journey, the train leaves Mendoza on Tuesdays and Saturdays at 8.00 a.m., arriving at Buenos Aires at 23.20 p.m. The first class return fare by this train between Buenos Aires and Mendoza has been fixed at the special rate of $90·85 paper (approximately £5 12s. 2d.). The Pullman supplement varies between $5.00 and $8.00 (approximately 6s. 2d. and 9s. 11d.) each way, according to distance. There are eight intermediate stops in both directions.

A Well-organised Train Robbery

Another daring hold-up of a passenger train on the North Central Argentine (State) Railway was perpetrated by a gang of bandits on the night of May 31. The coup had evidently been carefully planned by the robbers, some of whom were travelling ostensibly as ordinary passengers. While the train was running through a wild and sparsely-populated region in the Chaco territory between Gancedo and La Paloma stations, five masked gunmen entered the mail van, and while intimidating the postal staff in charge with revolvers, proceeded to rifle the contents of the mail bags and detach the safe, which they threw out on to the line, where it was picked up by confederates and transferred to a waiting motorcar. The robbers then escaped with their booty, variously estimated at between $70,000 and $100,000 paper, despite a vigorous pursuit by the police, whose efforts to effect a capture were handicapped by the fact that the bandits had cut the telegraph wires at a number of points in the neighbourhood.

Engineering and Transport Meetings

The opening meeting of the current session of the River Plate Branch of the Institution of Mechanical Engineers was held in Buenos Aires on May 17, when a series of cinematograph films, dealing with various mechanical operations, was shown by Mr. G. de Bourbel, of Percy Grant & Company, Limited, on behalf of Mr. J. G. Mayne, M.Inst.T., of the same firm, who was unable to attend owing to indisposition. Mr. W. C. R. Livesey, Chairman of the branch, presided.

The first two films dealt with the oxy-acetylene flame and its uses. The process of extracting oxygen from the air, and the manufacture of acetylene by means of the action of water on carbide of calcium were shown, followed by demonstrations of welding, platecutting (as exemplified in the demolition of the *Mauretania*) and metal-spraying. A third film, entitled "The Private Life of a Rail Joint," stressed the dangers of faulty or worn joints, and showed the method of combating such defects by means of tapered shims. Two other films were devoted to rail-bonding and the Wagoer boiler shop equipment.

The opening meeting of the Argentine and River Plate Centre of the Institute of Transport was held in Buenos Aires on May 28, when the Chairman, Mr. J. G. Mayne, M.Inst.T., Managing Director, Percy Grant & Company, Limited, delivered his inaugural address on "Railway Amenities." Among the many subjects covered by this paper was air-conditioning on American railways. The lecturer drew some interesting and instructive comparisons between the railways of South Africa, Norway, Sweden, Uruguay, India, France, Finland, Denmark, Chile, Canada, Brazil, the L.M.S.R., L.N.E.R. and the Southern Railway of England, which reflected very favourably on the Argentine railways as a whole, considering the number of passenger-miles run and the excellent service given to the public.

CEYLON

Some Details of the Hammond Report

The Hammond Commission's report has now been published in Ceylon. [A summary of, and editorial upon it, appeared in our issue of June 11—Ed. *R.G.*] Among its detailed recommendations is included a list of lines to be closed, namely, the Kelani Valley, Negombo-Puttalam, Nanu Oya-Ragalla and Kandy-Matale sections.

Regarding the proposed Ceylon Railway Board, the report recommends that the two members elected by the Council of State should not serve on any executive committees, and one of them should be Vice-Chairman of the board, whose duty it should be to submit the railway estimates to the Council of State. This measure is considered necessary because the railway may have a deficit for a few years until its finances have been brought back to a healthy state, and no council should be asked to vote moneys to make good the deficit without an opportunity for discussion. If possible, however, it should be laid down that the estimates must be considered *en bloc* and not item by item. The annual accounts also should be presented to the council, which would then have the opportunity for expressing its views upon policy.

In regard to rates and fares, states the report, the powers of the Council of State to make changes in them should be abolished. Further, in the scheme outlined by the commission, the sanction of neither the Financial Secretary nor the Executive Committee of Communications and Works would be necessary, thus leaving the Railway Board free to make such changes as it thinks suitable.

As regards the interest on capital, the commission states that the railway can-

not pay interest on its present capital, which should be reduced to a nominal figure of, say Rs. 1,000,000, bearing no fixed interest. Any new capital provided by the Government should bear interest at 3½ per cent. per annum.

FRANCE

Proposed Rise in Railway Tariffs

Proposals to increase railway tariffs are among the measures to be taken by the Government to improve the financial situation. The railway systems have already submitted a plan for higher freight rates. Charges for agricultural produce may be increased by fr. 5 a kg. for parcels of 20 to 30 kg. (44 to 66 lb.) when carried long distances. For other parcels up to 50 kg. (110 lb.), the proposed increase in fast goods rates varies from fr. 1 to 5. For slow goods, the increases are smaller. The increases in all categories vary from 5 to 20 per cent. The higher percentages are applied to goods in bulk, for which road transport does not compete; and the lower percentages to articles which offer the most profit to road hauliers.

SWITZERLAND

New Mountain Railways

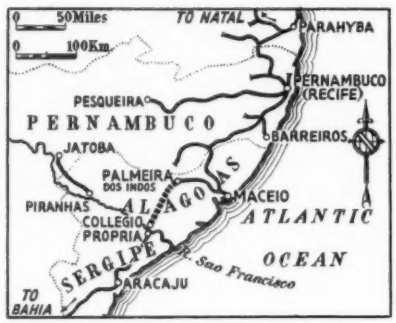
An aerial cableway is to be built from Kandersteg to the Oeschinen valley (1,727 m.), whence one of the now numerous " sledgeways " (cable-hauled sledges using the snow as a track and worked on the funicular railway principle) will lead to fine ski-ing slopes at an altitude of 2,000 m. The line is to be completed in time for the next winter sports season.

The cable railways from St. Moritz to Chantarella and Corviglia are to be extended by the construction of a new line from Corviglia to Piz Nair.

BRAZIL

New Lines in North-East Brazil

In a recent conference held at Recife, capital of the State of Pernambuco, dealing with the question of railway extensions in the north-east of Brazil, Dr. Luro Borba, the State of Sergipe representative, gave an outline of his State's requirements. He requested an extension of the railway line from Palmeira dos Indios, in the State of Alagoas, to the small town of Collegio, on the banks of the river São Francisco. This extension would run for 128 km. entirely through Alagoan territory, but, economically, would have the advantage of joining up the State of Bahia, south of Sergipe, with the States of Alagoas, and also Pernambuco, Parahyba and Rio Grande do Norte further north, because the Eastern Railways of Brazil already run to Propriá, on the opposite bank of the river São Francisco to Collegio, and extend as far south as Contendas. As there is also a scheme to extend the Rêde Bahiana to Montes Claros, Sergipe would then be linked



Sketch map showing the Palmeira-Collegio project

up to the State of Minas Geraes also. The construction of a bridge from Collegio to Propriá would be dealt with afterwards.

MANCHUKUO

Meiho-Tunghwa Construction

The Meiho—Tunghwa line, which has been under construction for nearly two years, has now been completed, and has been placed under the South Manchuria Railway Company for working on behalf of the Manchukuo Government. The line, which is intended eventually to shorten considerably the distance between Hsinking and the Korean railways and ports, will be carried forward to Chian, on the Korean border as the next step.

It is reported that arrangements are under consideration for the transfer of the South Manchuria Railway Police to the Manchukuo Government. The number of men affected will be about 8,000.

Attempted Train Wrecking

An explosion occurred on the eastern section of the North Manchuria Railway on May 28 near the junction with the Harbin-Lafa Railway a few miles from Harbin. It was discovered that a charge of dynamite had been placed under the track and it is thought to have been an attempt to wreck a heavily laden passenger train which was due from Sankoshu about that time, 10 p.m.

Sino-Manchukuo-Korean-Japanese Through Traffic

An arrangement was completed in May for through traffic facilities to be brought into operation for goods traffic passing over the Peiping—Mukden Railway from Shanhaikwan to and from all stations on Korean and Japanese Railways.

In order to effect a general improvement in traffic operation, an entirely new timetable is in course of preparation for the whole of the Manchurian railway system to come into operation on October 1, 1937. Connections to improve the through working between China, Korea, Manchuria and Japan are being given special attention.

CHINA

New British Loan for Nanking-Shanghai Line

An agreement was signed on June 5 at Nanking by a representative of Jardine Matheson & Co., Ltd., on behalf of The British and Chinese Corporation. The loan is for £800,000, and is for the development of the Nanking—Shanghai Railway. The line is to be doubled between Shanghai and Soochow, and relaid throughout. A reduction in spacing of sleepers is required, as there has hitherto been economy in the use of sleepers on certain lengths, and the heavier traffic now calls for general strengthening of the road. Improved signalling equipment is also necessary. Jardine Matheson & Company and the Hong Kong and Shanghai Banking Corporation are the agents in China for the British and Chinese Corporation.

The doubling work has been long projected, and is to be put in hand at once, to cope with existing congestion and in anticipation of additional through traffic from other lines. As this line connects the greatest commercial centre in the Far East, Shanghai (with its 3,000,000 inhabitants) and the capital of the Republic (with nearly 1,000,000) it is of great importance, especially now that there is through running from Shanghai not only to North China via Nanking, but also to Wuhu and the South-East.

The bridges are already built for double line between Shanghai North and Soochow, and there are lengths of double line in operation near stations. So that though earthwork will be considerable, the doubling should be straightforward and rapid. The present short length of double track between Shanghai and Nansiang is not worked as double line, the second track being used for an independent shuttle service between these points.

Progress of Construction Works

On the Nanking—Kiangsi Railway extension from Sunchiapu to Kweichi—a section of the future Nanking—Canton through route—platelaying began at the beginning of June.

Heavy rock-blasting is in progress on the Chengtu—Chungking construction, and a very large number of men is now employed day and night.

Although the survey has not been completed throughout the Hunan—Kweichow line, and alternative routes are still being compared between Yuping and Ping-yuch—where difficult country has to be negotiated—construction work has begun at certain points where it is easier

The Lung-Hai Railway has completed the erection of the steel girder bridge

2,500 ft. long, spanning the Wei river at Shenyang (Sienyang) in Shensi, and it was opened for traffic on June 1. This bridge is on the Sian—Paochi extension.

All-Steel Rolling Stock

In these columns for July 10, 1936, the 49 Belgian-built all-steel coaches for the Lung-Hai Railway, the first 27 of which reached China in May, 1936, were briefly described, but the following are fuller details of this fine rolling stock [which is illustrated on pages 68-9—ED. *R.G.*] The 49 vehicles have been built by the Société Anonyme La Brugeoise et Nicaise & Delcuve, at St. Michel-lez-Bruges.

Your correspondent, who was enabled to inspect some of the stock at Shanghai, was impressed by their soft green livery and gold lettering, not to mention their design, equipment, comfort and workmanship, features equal to the best in the Far East. The principal dimensions of the vehicles, which all have similar underframes and body shells, are:—

Length over couplers	68 ft. 11 in.
,, ,, body...	62 ft. 3 in.
Width ,, ,, ...	9 ft. 10 in.
Max. height above rail	14 ft. 3 in.
Dist. apart bogie centres	47 ft. 7 in.
Bogie wheelbase	8 ft. 0 in.
Wheel diameter	3 ft. 3 in.

Tare weights vary from 41½ to 47 tons.

Underframes, body framing, roof and side sheeting are all riveted, the two latter being lined with ⅜ in. cork and a 7/16 in. layer of Celotex behind the interior woodwork for insulation from noise, vibration and extreme temperatures. Stone's train lighting and steam heating are installed, and all windows are double and of plate glass in teak frames; a brass wire gauze mosquito frame is also fitted to every window during the summer. First class panelling is in mahogany, second class in teak, and third in oak and teak.

The first class coaches which are convertible for day and night use, have eight compartments and a lavatory between each two compartments. A Pullman-type berth lets down longitudinally above the windows in each compartment and the seat makes a second berth. The dining cars each seat 16, and also have two first class day compartments each seating six. Second class coach compartments are also convertible for night and day use and there are seven in each vehicle; each has four berths. There is a four-basin lavatory in each second class coach. The second-third composites are for day use and each seat 26 second and 56 third class passengers, the second class seats being rattan-covered and the third of wood. There is a two-berth sleeping compartment for train staff in each luggage van. Your correspondent is indebted to MM. Lambert (General Manager), Robert (Secretary) and Preyaux (Engineer in charge of erection) all of the Lung Hai Railway, for facilities for inspecting and for particulars about these coaches.

TANGANYIKA

Sentinel Locomotives

Official information has been issued regarding eight 0-4-0 type Sentinel locomotives which had been in service for light train working and shunting on the Government Railways for six years. The coal consumption for shunting at the end of the six years was only 4 cwt. a day and as the bunker capacity is 12 cwt. 3 qr. the locomotive was able to be run for three full days without refuelling. The total cost for a 30-day month working 8 hr. a day was £35 16s. 6d. including 7 per cent. per annum allowance for depreciation, and 5 per cent. for interest.

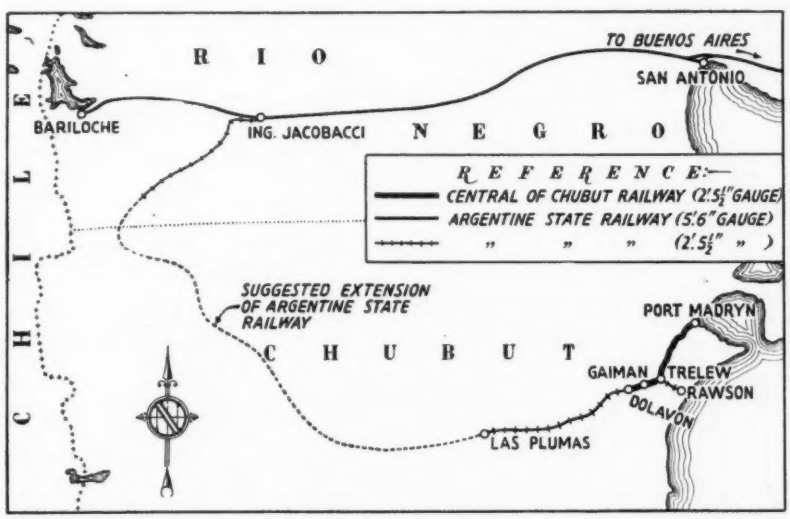
For light train working with one coach seating 81 passengers on a 112-mile trip, the cost per mile worked out at exactly 5d., and the coal consumption at 11·82 lb.; 4·18 gal. of water were used a mile. This type of engine has proved capable of handling a 450-ton load on the level, and during the six years in service each engine was opened out for inspection only at half-yearly intervals. The eight engines referred to above were supplied to the Government Railways in 1930, and two railcars of the Sentinel-Cammell type are also in service; a third car is, moreover, on order.

The Central Railway of Chubut

As the final steps are now being taken in the voluntary liquidation of the Central Railway of Chubut Co. Ltd., it is opportune to outline the unusual history of this undertaking. The company was incorporated in London on July 27, 1886, and built a metre-gauge line in Patagonia some 65 miles long, extending from Port Madryn on New Bay to Dolavon. In July, 1922, the sale of the line to the Argentine Government was sanctioned by the shareholders, but in November of the same year the directors announced that, owing to exceptional circumstances, it had not been possible to complete a contract for purchase.

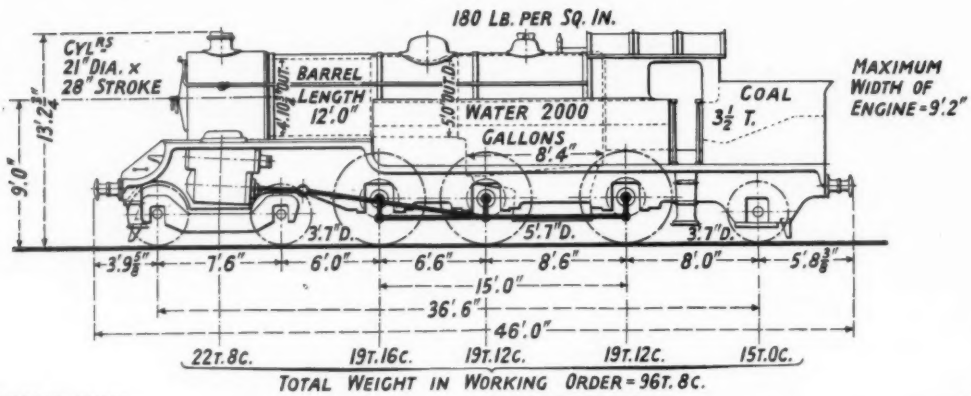
The line was therefore leased to the Argentine State Railways as from November 1, 1922, and the Administrator of the State Railways agreed to continue the lease until such time as Congress came to a decision with regard to purchase. In October, 1923, the State Railways built a branch line from Trelew to Rawson, a distance of 9 miles, and this was of 75 cm. gauge. By January, 1925, the State Railways had extended the line from Dolavon to Las Plumas, a distance of 90 miles, or approximately 155 miles from Port Madryn. This extension was also of 75-cm. gauge, and the State Railways laid down a 75-cm. gauge track on the company's sleepers between Trelew and Dolavon. In 1930 the State Railways also laid a 75-cm. gauge track on the line between Port Madryn and Trelew. The whole of the line is now therefore of 75 cm. gauge.

In August, 1936, the company's railway was sold to the Argentine State Railways. The Central Railway of Chubut in London passed a resolution for voluntary liquidation on December 18, 1936, and Mr. H. C. Withers was appointed Liquidator. The declaration of a first payment of 14s. a £1 share was made on the same date. The 6 per cent. debentures of the company were repaid at par on May 13, 1937.



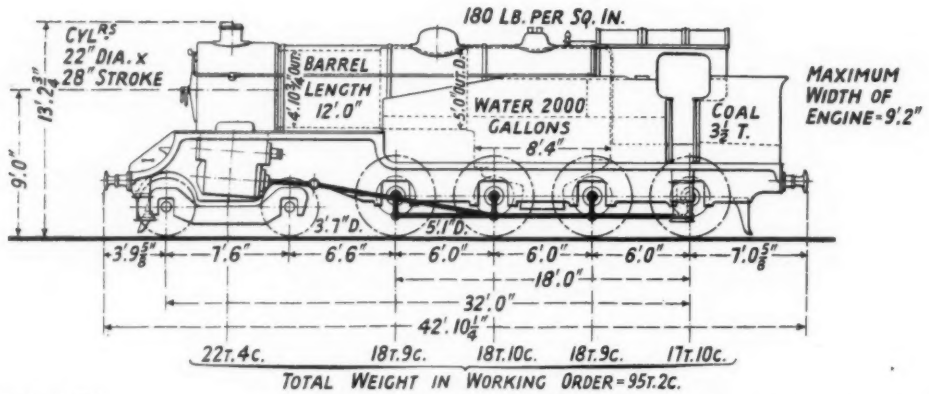
Sketch map of the Central Railway of Chubut and neighbouring existing and proposed lines

British Locomotive Types—XVI Southern Railway



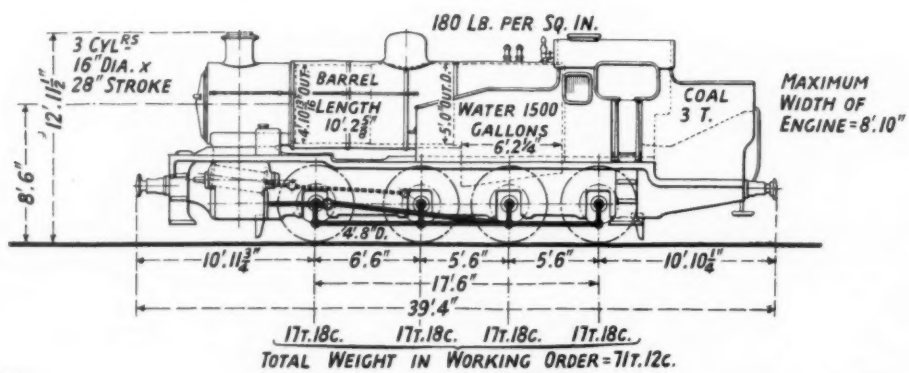
HEATING SURFACE, TUBES—		SUPERHEATER	252 SQ. FT.
LARGE AND SMALL	1,267 SQ. FT	COMBINED HEATING SURFACES	1,658 ,,
FIREBOX	139 ,,	GRATE AREA	27 ,,
TOTAL (EVAPORATIVE)	1,406 ,,	TRACTIVE EFFORT (AT 85 PER CENT. B.P.)	28,200 LB.

H 16 Class



HEATING SURFACE, TUBES—		SUPERHEATER	252 SQ. FT.
LARGE AND SMALL	1,267 SQ. FT.	COMBINED HEATING SURFACES	1,658 ,,
FIREBOX	139 ,,	GRATE AREA	27 ,,
TOTAL (EVAPORATIVE)	1,406 ,,	TRACTIVE EFFORT (AT 85 PER CENT. B.P.)	34,000 LB.

C 16 Class



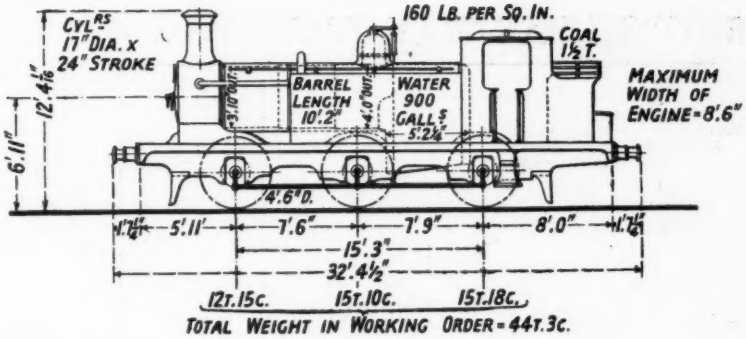
HEATING SURFACE—		GRATE AREA	18·64 SQ. FT.
TUBES	1,173 SQ. FT.	TRACTIVE EFFORT (AT 85 PER CENT. B.P.)	29,376 LB.
FIREBOX	106 ,,		
TOTAL (EVAPORATIVE)	1,279 ,,		

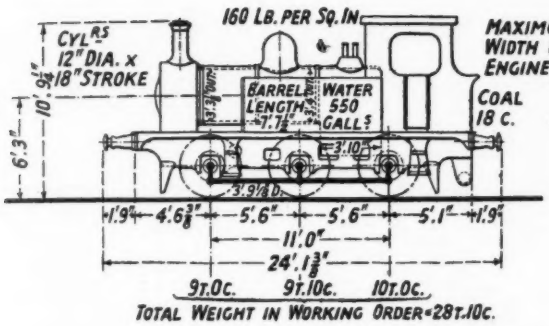
Z Class

(Right)

HEATING SURFACE—	
TUBES	895 SQ. FT.
FIREBOX	82 ,,
TOTAL (EVAPORATIVE)	977 ,,
SUPERHEATER	—
COMBINED HEATING SURFACES	—
GRATE AREA	15·5 ,,
TRACTIVE EFFORT (AT 85 PER CENT. B.P.)...	17,500 LB.

E¹ Class





(Left)

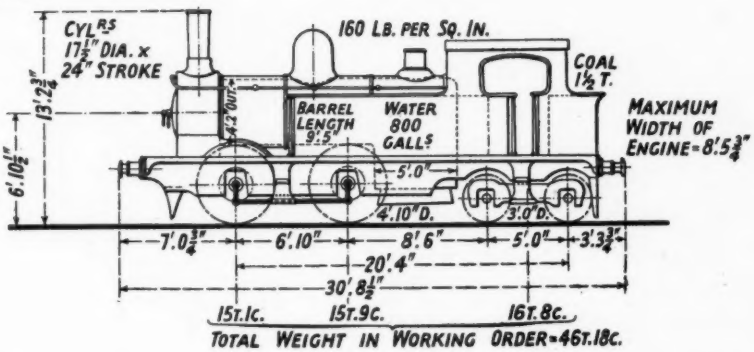
HEATING SURFACE—	
TUBES	387·34 SQ. FT.
FIREBOX	51·69 ,,
TOTAL (EVAPORATIVE)	439·03 ,,
SUPERHEATER	—
COMBINED HEATING SURFACES	—
GRATE AREA	9·1 ,,
TRACTIVE EFFORT (AT 85 PER CENT. B.P.) ...	7,830 LB.

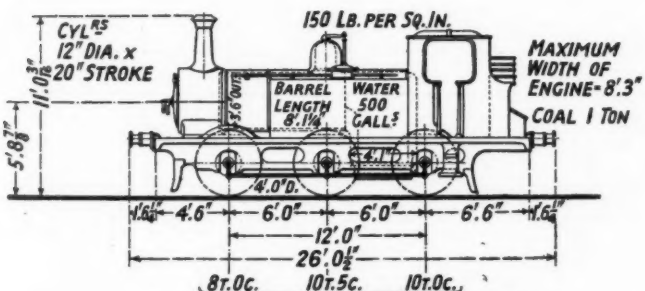
P Class

(Right)

HEATING SURFACE—	
TUBES	898 SQ. FT.
FIREBOX	89 ,,
TOTAL (EVAPORATIVE) ...	987 ,,
SUPERHEATER	—
COMBINED HEATING SURFACES	—
GRATE AREA	13·83 ,,
TRACTIVE EFFORT (AT 85 PER CENT. B.P.)	17,245 LB.

O 2 Class





(Left)

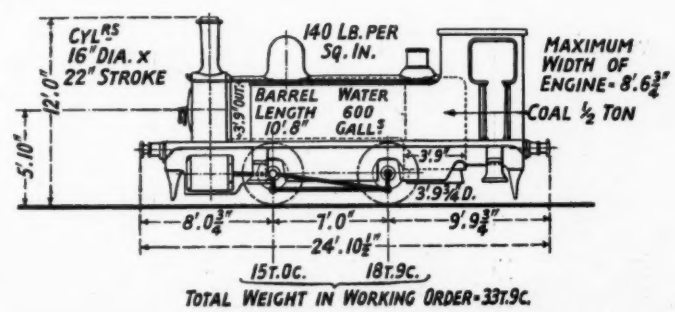
HEATING SURFACE—	
TUBES	433·16 SQ. FT.
FIREBOX	55·56 ,,
TOTAL (EVAPORATIVE)	488·72 ,,
GRATE AREA	10 ,,
TRACTIVE EFFORT (AT 85 PER CENT. B.P.)	7,600 LB.

A¹x Class

(Right)

HEATING SURFACE—	
TUBES	766 SQ. FT.
FIREBOX	57 ,,
TOTAL (EVAPORATIVE)	823 ,,
GRATE AREA	10·78 ,,
TRACTIVE EFFORT (AT 85 PER CENT. B.P.)	14,660 LB.

B 4 Class



BRITISH RAILWAY STATISTICS

"The Railway Gazette" monthly table for Mar., 1937, as compared with Mar., 1936, compiled from the Ministry of Transport Statement No. 208

Description	Great Britain*	G.W.R.	L.N.E.R.	L.M.S.R.	S.R.
PASSENGER TRAIN TRAFFIC—					
Number of pass. journeys (ex. season ticket holders)	107,969,876	7,446,479	15,517,258	25,890,424	18,171,192
Increase (+) or decrease (−)	+ 8,819,844	+ 755,324	+ 1,426,326	+ 3,265,434	+ 1,351,313
Passenger receipts (excluding season ticket holders)	£4,304,863	£564,248	£858,490	£1,355,889	£926,832
Increase (+) or decrease (−)	+ £974,489	+ £149,163	+ £209,250	+ £347,522	+ £218,675
Season ticket receipts	£846,637	£47,990	£137,084	£209,515	£299,097
Increase (+) or decrease (−)	+ £20,793	− £1,895	+ £3,253	− £898	+ £24,956
Parcels and misc. traffic receipts (excluding parcels post)	£1,084,650	£196,621	£324,883	£417,570	£127,026
Increase (+) or decrease (−)	+ £13,067	− £5,801	+ £1,103	+ £13,193	+ £4,695
FREIGHT TRAIN TRAFFIC—					
Freight traffic (tons) (excluding free-hauled)	24,089,385	5,627,647	10,981,883	11,454,014	1,331,588
Increase (+) or decrease (−)	+ 1,312,081	+ 564,916	+ 549,279	+ 589,545	− 49,948
Net ton-miles (excluding free-hauled)	1,404,379,934	259,346,415	471,600,567	578,154,483	56,748,177
Increase (+) or decrease (−)	+ 64,775,951	+ 18,901,620	+ 23,077,397	+ 21,164,475	+ 829,161
Average length of haul (miles) (excluding free-hauled)	58·30	46·08	42·94	50·48	42·62
Increase (+) or decrease (−)	− 0·51	− 1·41	− 0·05	− 0·79	+ 2·14
Freight traffic receipts	£7,589,526	£1,281,000	£2,493,000	£3,197,000	£380,504
Increase (+) or decrease (−)	+ £349,878	+ £67,700	+ £138,000	+ £152,000	− £6,256
Receipts per ton-mile	1·297d.	1·19d.	1·27d.	1·33d.	1·61d.
Increase (+) or decrease (−)	—	-- 0·03d.	+ 0·01d.	+ 0·02d.	− 0·05d.
Freight train-loads : Average train-load (tons)	133·67	138·53	139·06	131·64	107·63
Increase (+) or decrease (−)	+ 1·70	+ 3·52	+ 0·85	+ 0·84	+ 1·72
Net ton-miles—					
Per train engine-hour	956·18	1,030·54	1,024·77	893·93	826·32
Increase (+) or decrease (−)	− 23·95	− 20·84	− 30·17	− 34·79	+ 23·07
Per shunting-hour	904·60	832·43	1,011·79	919·31	584·28
Per total engine-hour	464·84	460·48	509·12	453·22	342·27
Net ton-miles per route-mile per working day	3,085	3,024	3,286	3,678	1,214
Increase (+) or decrease (−)	+ 144	+ 208	+ 166	+ 147	+ 4
Wagon-miles. Total	389,823,710	70,677,904	135,884,391	164,313,741	18,273,286
Increase (+) or decrease (−)	+ 7,977,955	+ 2,328,900	+ 4,583,989	+ 2,721,965	− 245,647
Percentage of loaded to total	66·94	67·72	64·94	68·36	66·25
Wagons per train. Total	35·03	35·28	35·49	34·95	32·46
Increase (+) or decrease (−)	− 0·40	− 0·34	− 0·56	− 0·42	− 0·21
Loaded	23·45	23·89	23·05	23·89	21·50
Empty	11·58	11·39	12·44	11·06	10·96
Train-miles. Coaching—Per train-hour	15·10	14·03	14·23	14·35	17·83
Per engine-hour	12·15	11·21	11·09	11·02	14·86
Train-miles. Freight—Per train-hour	8·40	9·04	8·68	7·88	9·36
Per engine-hour	3·48	3·35	3·71	3·44	3·13
Engine miles. Total	47,494,136	7,608,781	13,251,478	17,684,632	6,111,179
Increase (+) or decrease (−)	+ 1,145,930	+ 199,469	+ 500,259	+ 487,141	+ 37,638
Mileage run by engines. Total train-miles—					
Coaching	22,696,900	3,117,744	5,242,498	7,212,445	4,464,840
Freight	11,129,723	2,003,367	3,828,898	4,701,335	562,889
Engine-hours in traffic. Total	5,290,364	907,089	1,584,450	2,108,675	500,540
Increase (+) or decrease (−)	+ 199,973	+ 44,996	+ 79,708	+ 88,008	− 3,844
Shunting miles per 100 train-miles—					
Coaching	7·44	6·96	6·54	8·06	8·27
Freight	73·40	82·71	67·43	70·20	96·49

Passenger Traffic Statistics: Number of journeys, receipts, and receipts per journey (excluding season ticket holders)—March, 1937

Subject	Great Britain	G.W.R.	L.N.E.R.	L.M.S.R.	S.R.	Cheshire Lines	Liverpool Overhead	L.P.T.B.†	Mersey
Full fares—									
Pass. journeys	33,925,983	685,235	1,141,772	1,537,237	2,788,367	14,966	168,574	26,684,252	86,676
Gross receipts	£900,230	£75,042	£124,177	£126,128	£192,995	£2,480	£1,700	£361,359	£1,525
Receipts per pass.	6·37d.	26·28d.	26·10d.	19·69d.	16·61d.	39·77d.	2·42d.	3·25d.	4·22d.
Reduced fares									
Excursion and week-end—									
Pass. journeys	42,492,588	4,449,505	9,653,224	15,794,753	8,710,418	468,968	85,571	1,524,534	684,654
Gross receipts	£2,606,446	£401,792	£581,233	£979,254	£537,908	£26,441	£848	£33,052	£10,471
Receipts per pass. journey	14·72d.	21·67d.	14·45d.	14·88d.	14·82d.	13·53d.	2·38d.	5·20d.	3·67d.
Workmen—									
Pass. journeys	27,645,489	1,863,318	3,690,816	7,454,177	5,870,126	260,938	216,472	7,167,334	227,040
Gross receipts	£405,068	£27,873	£60,204	£120,468	£97,137	£4,400	£1,751	£80,334	£2,032
Receipts per pass. journey	3·52d.	3·59d.	3·91d.	3·88d.	3·97d.	4·05d.	1·94d.	2·69d.	2·15d.
Other—									
Pass. journeys	3,897,257	446,439	1,029,600	1,100,563	801,304	29,306	46,789	364,505	9,851
Gross receipts	£382,488	£57,259	£90,412	£125,077	£97,922	£3,321	£304	£3,059	£165
Receipts per pass. journey	23·55d.	30·78d.	21·08d.	27·28d.	29·33d.	27·20d.	1·56d.	2·01d.	4·02d.
Total—									
Pass. journeys	107,969,876	7,446,479	15,517,258	25,890,424	18,171,192	774,222	517,406	35,740,625	1,008,221
Gross receipts	£4,304,863	£564,248	£858,490	£1,355,889	£926,832	£36,679	£4,603	£477,804	£14,193
Receipts per pass.	9·57d.	18·19d	13·28d.	12·57d.	12·24d.	11·37d.	2·14d.	3·21d.	3·38d.

* All standard gauge railways

† Includes passengers originating on the railway undertakings, and on the Whitechapel and Bow Joint Railway

ROBERT STEPHENSON AND HAWTHORNS LIMITED

From the beginning of this month the two famous pioneer locomotive-building firms—Robert Stephenson & Co. Ltd, and R. & W. Hawthorn, Leslie & Co. Ltd.—have amalgamated their locomotive activities

WORLD-WIDE interest in the amalgamation, insofar as their locomotive activities are concerned, of the celebrated locomotive building firms, Robert Stephenson & Co. Ltd. and R. & W. Hawthorn, Leslie & Co. Ltd., may not be unaccompanied by some measure of sentimental regret at the loss of individuality on the part of two great pioneers, but the famous names and reputations are being preserved in the combined title of Robert Stephenson and Hawthorns Limited, and many congratulatory views have already been expressed that two firms which have been intimately associated with the development of the locomotive should have joined hands. For more than 75 years of their long lives these two firms existed side by side in Forth Street, Newcastle-upon-Tyne, and from this ten acres of ground came forth the multi-tubular boiler, the Stephenson link motion, the first locomotive superheater, and a host of other standard details of locomotive practice. The reputation of the firms during the first 50 years of public railways virtually stood out head and shoulders above that of most of their British and foreign competitors, and led Jules Verne to record that the machine which reached the North Pole bore the nameplate " R. & W. Hawthorn."

Robert Stephenson & Co.

Although six years younger than its new co-partner, the Stephenson firm has a longer record of locomotive construction, dating from its foundation year, 1823. The four original partners as shown in the original Agreement of June 23, 1823, were George Stephenson (2 shares), Robert Stephenson (2 shares), Edward Pease (4 shares), and Michael Longridge (2 shares). The capital was £4,000 divided into 10 shares. Robert Stephenson, though the youngest partner and had still to earn his reputation as as engineer, was named as managing partner, but later the two Stephensons were busily engaged in railway civil engineering, and the works management at Forth Street was entrusted for a time to Michael Longridge, from whose works at Bedlington came many of the boiler plates, and even complete boilers. Among the most famous of the early Stephenson locomotives were the *Locomotion* for the Stockton & Darlington Railway (1825); the *Lancashire Witch* for the Bolton & Leigh Railway (1828); the *Rocket* (1829) and its fellows on the Liverpool & Manchester; the *Invicta* (1830) of the Canterbury & Whitstable; and, in 1830, the *Planet* type of locomotive, with horizontal inside cylinders below the smokebox, a crank axle, and outside plate frames.

The early thirties saw the beginning of the export business, and the market soon extended to America, Germany, Belgium, France, Austria, Russia, and Italy. It is noteworthy that *Der Adler* (1835) for the Ludwigsbahn between Nuremberg and Fürth, and the *Stephenson* and *La Flèche* (both of 1835) of the Belgian State Railways inaugurated public steam traction in their respective countries. During the year 1831 an agreement was made whereby Robert Stephenson was authorised by his firm to begin with Charles Tayleur and others a locomotive works near Liverpool which eventually became the Vulcan Foundry. Here it was that Daniel Gooch began his training, and in 1837, on his appointment to be Locomotive Superintendent of the G.W.R., he introduced to that railway a number of successful locomotives of Stephenson or Vulcan design and build. The famous *North Star* was a Stephenson engine built at the Newcastle works, originally to the 6-ft. gauge for America, and altered to suit Brunel's 7-ft. gauge. Products of the 1840's were the celebrated Stephenson link motion, the long-boiler engine, and the three-cylinder locomotive.

In 1848 George Stephenson died, and his financial interest in the firm passed to Robert. Ten years later Edward Pease died in his ninety-second year, and Michael Longridge at the age of 72. The last of the original partners, Robert Stephenson, died in 1859, but the Stephenson connection was kept up by George Robert Stephenson, a nephew of " Old George," who was on the board until 1899, when the concern was changed to a public limited company. In 1886 the original firm had been changed into a private limited company, mainly in order to extend the activities to include shipbuilding, a step which appears to have been taken as a result of Hawthorn's continued success in that field.

In 1899 the private company was wound up voluntarily, and a new public limited company was formed. At this time Mr. George Robert Stephenson retired from the concern, and thus brought to an end the connection of the Stephenson family; he died in retirement in 1905 aged 86. By far the most important—and it was also practically the first—decision of the new company was to move the works from the cramped position in Forth Street, where no extension could be made, and a site was chosen at Darlington. The first locomotive was steamed at the new works in October, 1902. Despite continued financial difficulties, a policy of improving and extending the new works was adopted and consistently pursued. A financial reconstruction was carried out early in 1914 under the chairmanship of Sir William B. Peat, and this organisation has lasted more or less to the present day.

Hawthorn, Leslie

The history of R. & W. Hawthorn has been by no means complex, for the only change was the formation into a private company after the retirement in 1870 of William Hawthorn, three years following the death of his brother Robert. It was this company that in 1870 erected the marine engine works at St. Peter's (Newcastle), and in 1884 absorbed the Hebburn shipbuilding yard of Andrew Leslie. Marine work had formed part of the activities of Hawthorn's from the earliest days, and tided the firm over more than one period of depression in the locomotive industry. The limited company, R. & W. Hawthorn, Leslie & Co. Ltd., was incorporated on April 7, 1886.

Founded in January, 1817, by Robert Hawthorn, to manufacture stationary steam engines, the company first undertook marine engineering work in 1820, and in that year adopted the familiar title of R. & W. Hawthorn on Mr. William Hawthorn, brother of the founder, becoming a partner. The firm did not begin to build locomotives, however, until 1831, when an order was received from the Stockton & Darlington Railway for some 0-6-0 engines of Timothy Hackworth's design, and with the rise of the railway system in Northumberland and Durham the order book was soon full. A well-known product of the firm in

1835 was the *Comet* for the Newcastle & Carlisle Railway. Two exceptions from normal locomotive practice were Thomas Elliot Harrison's geared engine, the *Thunderer*, and the 10-ft. single locomotive *Hurricane*, built for the Great Western Railway in 1838. Celebrated engines of a somewhat later date were the 2-2-2 *Plews* (1848) of the York, Newcastle & Berwick Railway, and its fellow, the *Queen*, on the Edinburgh & Berwick line; a number of Crampton engines; and, in 1853, Sturrock's famous 4-2-2 locomotive No. 215 for the Great Northern Railway. In 1844 Hawthorn's became associated with a German firm and opened a works at Ullersdorf under the title of Lindheim & Hawthorn.

Patrick Stirling, of G.N.R. fame, was on the Hawthorn staff at one time, and it was in Forth Street that he acquired the idea for his domeless boilers, for Hawthorns had patented in 1839 a perforated steam pipe intended to dispense with a dome. It was at the same time that the firm patented a steam-drier or superheater, and a decade later equalising beams were introduced. As with Stephenson's, the North Eastern Railway was one of the best customers, and many hundreds of express, tank, and goods engines were built for that line and its constituent companies. Industrial locomotives have formed a large part of the business since the formation of the limited company, and in recent years extensive and valuable experience has been gained in the construction of the mechanical parts of electric and diesel locomotives. Water-tube boilers for marine purposes are made in numbers at the Forth Bank works; this department is not included in the present merger.

The terms of the new amalgamation cover the construction of main-line locomotives at the Darlington works of Stephenson, and the concentration at Forth Banks of all the smaller locomotive work. Both works will operate under a unified control with the title of Robert Stephenson and Hawthorns Limited, and the new organisation will have as its new Chairman Major E. C. Straker, Chairman of R. & W. Hawthorn, Leslie & Co. Ltd.

TRAIN CONTROL AND TIMETABLE GRAPHS, VICTORIAN RAILWAYS

A description of the new and very effective system of reproduction of these graphs by a simple process, whereby last-minute alterations can be made on the master graph

SINCE the introduction of the train control system with the use of graphs, as an integral part of the train running practice of the various Australian State Railways, many attempts have been made to simplify production of the graphs. Until recently, no practical progress was made, and the methods requiring each copy to be traced or plotted by hand, remained in general use. Various alternatives were tried, including lithography, blue-printing, and other methods of reproduction from an original master graph, but each method, in the end, was abandoned. The main obstacle arose from the difficulty of developing a means of making satisfactory amendments to the master graphs required by constant alterations inseparable from ordinary train working.

An entirely new system of graph production has now been designed by Mr. Gordon Massey, Special Service Engineer, of the Victorian State Railways. Mr. Massey was instructed by Mr. H. W. Clapp, Chairman of Commissioners, to investigate the existing methods of graph design and production, with a view to effecting improvements, more particularly in respect of the train control graphs which were prepared singly, by hand, each day.

Train Control Graphs

The new system developed by Mr. Massey, as applied to control graphs, enables two-colour graphs to be printed from a master graph in unlimited quantities by utilising the ordinary blue-printing process. In the finished control graph, as developed by Mr. Massey, the train schedule lines, station names, and horizontal station lines, appear in blue, being over-printed on time lines lithographed in green. This is carried out by sensitising the lithographed graph forms with a ferro-prussiate solution; the printing of the time lines, &c., is then performed from a master negative.

The master negative is made by a novel process in which the train schedule lines, station names, &c., have been rendered transparent on an opaque background. In practice, the control graphs are produced as simply and cheaply as ordinary blue prints, and with very considerable saving over the hand method. The many difficulties of paper shrinkage, registration, and the like, have been entirely overcome, and the train schedules are printed with great accuracy.

The basic feature of the system is the ease and speed whereby alterations can be made to the master negative, leaving no trace of the amendments. Erasure does not affect the surface of the negative, and the life of the master negative is, therefore, not affected by the timetable changes. In addition, any number of correct prints can be immediately supplied when new schedules are brought into operation. The placing of control station names, and district particulars, on the negative is a further advantage provided by the system. This feature enables a common graph form to be used for all control districts, thus obviating the holding of large stocks of district forms. Further, the train schedule lines can be plotted with great accuracy on the master negative, a condition which, except at great expenditure of time, was not practicable with the old style hand-plotted control graphs.

Timetable Graphs

Similar improvements have also been effected by Mr. Massey in the production of timetable graphs for general use. The new process, as applied to timetable graphs, varies from that used in the making of train control graphs, in so far as a two-colour process is not used for the former. The master graph is prepared as a transparent positive, similar in some respects to an ordinary tracing. From the master graph, prints are made by the Dyeline or Helio process, giving black lines on a white ground. The special feature of Mr. Massey's new timetable graph system, and its master graph, is the ease and speed with which alterations can be made without interfering with the time lines of the graph form, or with the surface of the master graph.

At the request of the New South Wales Commissioner for Railways, Mr. Massey has recently installed the system in Sydney, and has also developed a modified form for the use of the Tasmanian and South Australian Government Railways. The system requires no elaborate plant, and can be installed at comparatively low cost. No photography is used in the preparation of the master graphs or negatives, nor is any special skill called for in the working of the process.

MEASURED SHOVEL PACKING, L.M.S.R.

A development designed to minimise the risk of error in shovel packing

ALTHOUGH the shovel packing of sleepers, inaugurated on the old L.N.W.R. in 1908, has been in use on many railways for several years, it was left to the engineers of the Northern Railway of France to devise a method of measuring by mechanical means the amount of chippings required to take out a known amount of slack. Previously the experience of the permanent way men was relied upon to judge the quantity of chippings required; but, in measured shovel packing, even the most inexperienced of gangs can be certain of accurate packing. The objection of British engineers to the French method of measuring* was that it seemed too elaborate to work well elsewhere. A simplified method is practised on Buenos Ayres & Pacific Railway,† and recently another modified system has been successfully adopted by the London Midland & Scottish Railway.

Above: Part of intermediate sighting board, showing adjustment and scale

Left: Sighting boards on rail ready for use, set closer than necessary to secure picture

Measured shovel packing by the L.M.S.R. method is accomplished in three steps. First the sag or dip in the track is measured by the use of sighting boards placed upon the head of the rail. Secondly the depression of the sleepers under a train is recorded on a series of voidmeters; and thirdly the requisite amount of chippings determined in the first two steps is spread under the sleepers.

To measure the extent to which the track is out of level when no traffic is on it, a set of three special sighting boards or boning rods is used. These boards are fitted to short posts having clips at the bases so that they are readily fixed on the top of the rail. One board is provided with a slit at the level of the eye of a man sitting on the rail; the second or intermediate board is painted half yellow and half black with a vertical division between these colours running down the centre of the board. The post of this intermediate board is adjustable in height and provided with a scale so that the amount of extension required to bring the top of the board level with the eye-slit in the first board is readily determined. The third board is painted with the face divided into four spaces to present a chequered appearance of four rectangles, the yellow and black colours being divided vertically down the centre and horizontally across the board at the same level as the eye-slit of the first board. All three sighting boards are fitted with spirit levels to ensure that they stand perfectly vertical when clipped to the rail.

The ganger sights along the rail in the usual way and locates two high spots preferably not more than 120 ft. apart. The first or eye-slit sighting board is then fixed at one high spot, and the third or target chequered board at the other. The second board is then placed on the rail over a sleeper intermediate between the high spots. The height of this board is then adjusted until the top is level with the eye-slit and the horizontal dividing line between the checks on the board most distant from the observer. The number of divisions revealed on the scale of the intermediate board when it has been raised is then read off and the figure chalked on the sleeper immediately below this board. The intermediate board is then moved over the other sleepers until the amount of " static " slack for all the sleepers between the high spots has been determined. This process is then repeated along the other running rail between the same high spots.

The permanent way gang is supplied with a dozen " voidmeters " for measuring the depression under the passage of a train. Steel bars some 18 in. in length are driven into the ballast about 3 in. from the side of each sleeper and one inch outward from the end of the chair. To each of these bars a voidmeter is clamped at such a height that the bottom of the turned-down end of the spring-loaded pointer is in contact with the top of the

* Described in THE RAILWAY GAZETTE on July 3, 1931, p. 12 and April 17, 1936, p. 736; and in THE RAILWAY ENGINEER of April, 1932, p. 156.

† THE RAILWAY GAZETTE of May 1, 1936, p. 864.

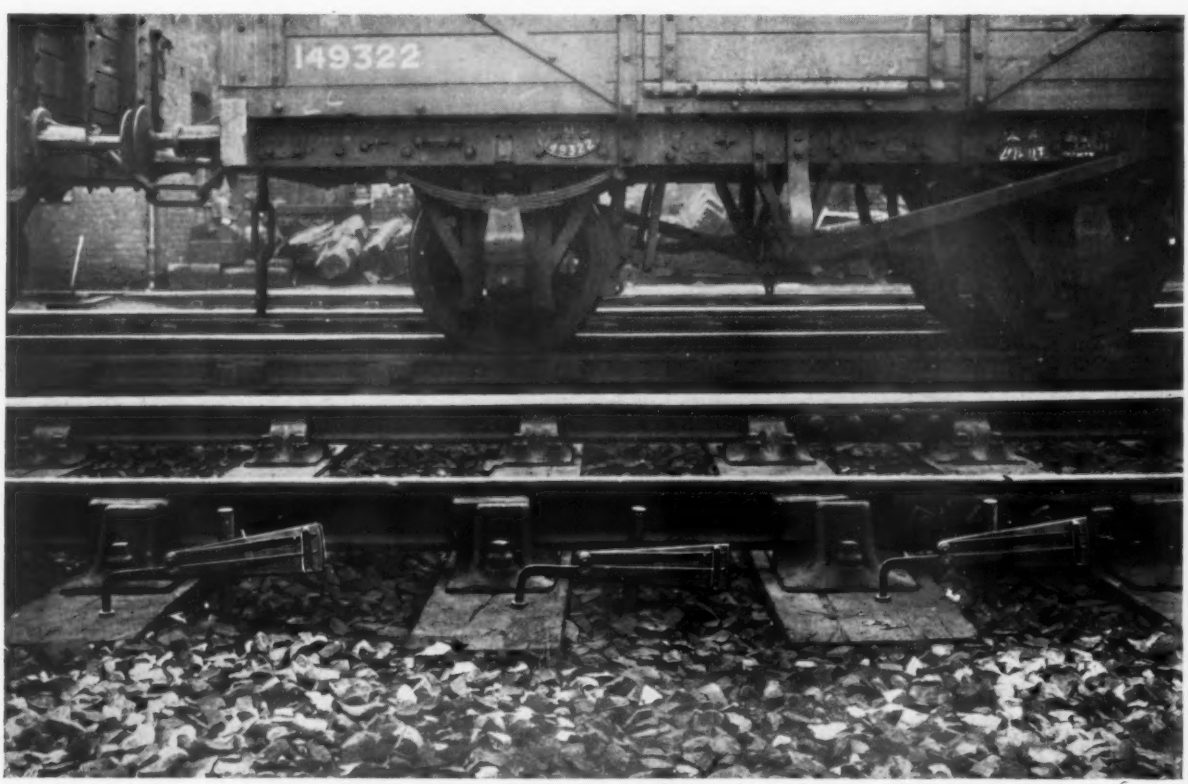
sleeper and the pointer exactly on one of the lower divisions on the scale. The second or loose pointer is then pushed down so that the projecting pin on it lies on the top of the spring pointer. Passing traffic depresses the sleepers and, with the set of 12 voidmeters, generally six on each side of the track at a time, the tails of the spring pointers in contact with the sleepers move with them, pushing up the upper or friction pointers. Thus, after a train has passed, the two pointers are separated by a distance having a fixed relation to the depression of the sleepers. The number of divisions on the scales by which the pointers on each voidmeter are separated is then read off and the figures chalked on the sleepers.

Voidmeter set ready for use

The sum of the figures obtained for each sleeper by these static and dynamic measurements determines the number of canisters of chippings required to be spread under each sleeper to take out both the depression in the " top " and the void which allowed it to sink under the wheel load.

Particular care is taken in using the voidmeters to see that the bars driven into the ballast are reasonably firm so that they will not be moved by the resistance of the pointer spring when traffic is passing. The friction pointer is adjusted so as to be just stiff enough in its movement to follow the spring-loaded pointer and remain at its highest position. A small thumb nut is used for adjustment. A modified type of voidmeter, illustrated overleaf, has recently been evolved and has the advantage, over the original design, of smaller size, and that the scale is easier to read and multiplies the sleeper movement by four.

If the size of the gang permits, the sighting and voidmeter measurements are taken by separate parties, and, under the same conditions, the packing is done by more than one man. In using this method of packing, as



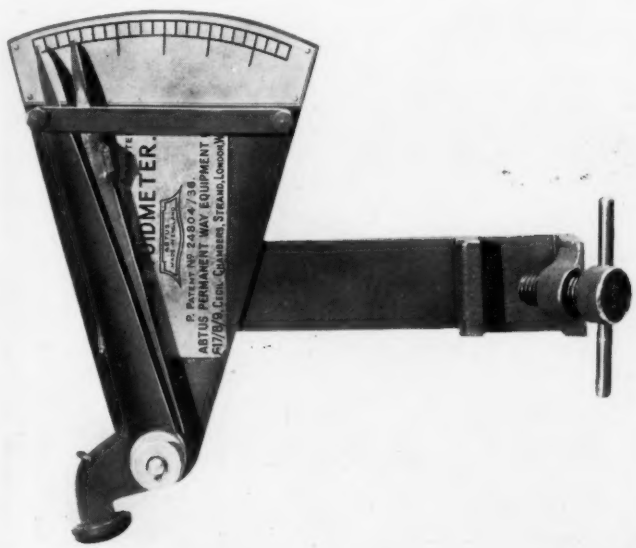
Voidmeters set on sleepers (actually they are usually placed on alternate sleepers)

Left: Chips canister, filled up to slit for 10-in., and full for 12-in. sleepers. Right: Inserting chippings under the jacked-up sleepers

with any other, no slack more than one inch combined is tackled at one time, and it is better to keep to half that figure as a maximum and to run over the section again with voidmeters and sighting boards a week or two later.

It is obviously important that the proper size of chippings be used and the size of the canister used on the L.M.S.R. has been based on the use of $\frac{1}{4}$-in. minimum to $\frac{1}{2}$-in. maximum granite chippings evenly spread over 15 in. on each side of the rail and completely covering the width of the sleeper for that distance. The canister, $3\frac{1}{2}$ in. internal diameter and $4\frac{7}{8}$ in. high is made of 20 S.W.G. lead-covered sheet iron spot-welded. To make this canister a measure for 10 in. as well as 12 in. wide sleepers, short slits are cut $\frac{7}{8}$ in. down from the top; for the narrower sleepers it is filled only up to the level of these slits, and for wider or joint sleepers it is filled flush with the top. The divisions on the scales of both the voidmeters and the intermediate sighting board are in units of canisters of chips and they do not necessarily represent a slack measured in inches, although on the L.M.S.R. each divison on the scale represents $\frac{1}{16}$ in. of slack.

The actual chip packing must be done by spreading, the track being lifted with a jack designed to fit snugly below the top of the rail and capable of instantaneous release on the approach of a train. The track is raised just sufficiently to permit the clear passage of the packing shovel with its charge under the sleeper. On the L.M.S. the ballast is removed from between every alternate pair of sleepers, and the chippings are spread from one side only of each sleeper, a special goose-neck shaped shovel having a flat blade $6\frac{1}{2}$ in. wide and 8 in. long being used. Care is always taken to ensure that all chair screws and other fastenings are quite tight before taking the measurements for shovel packing.



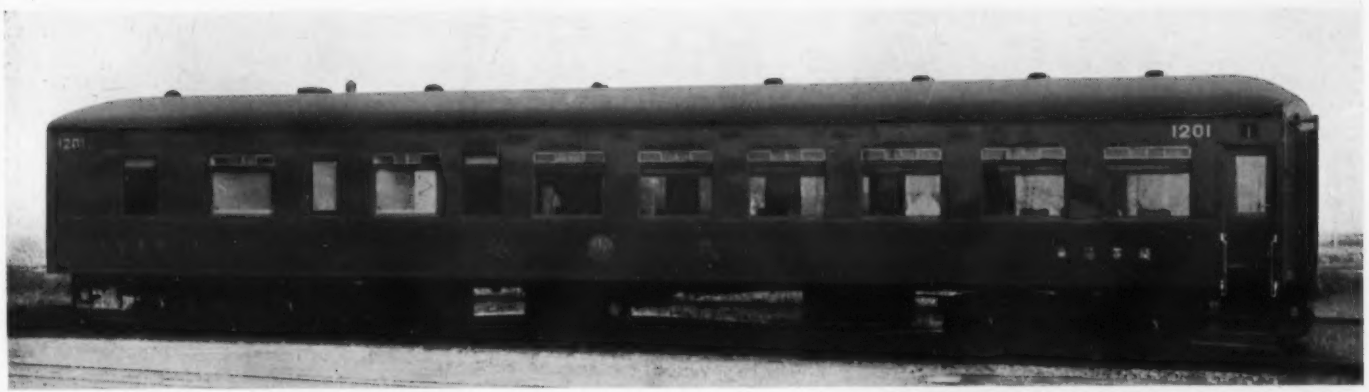
Latest type of voidmeter with 4 to 1 scale

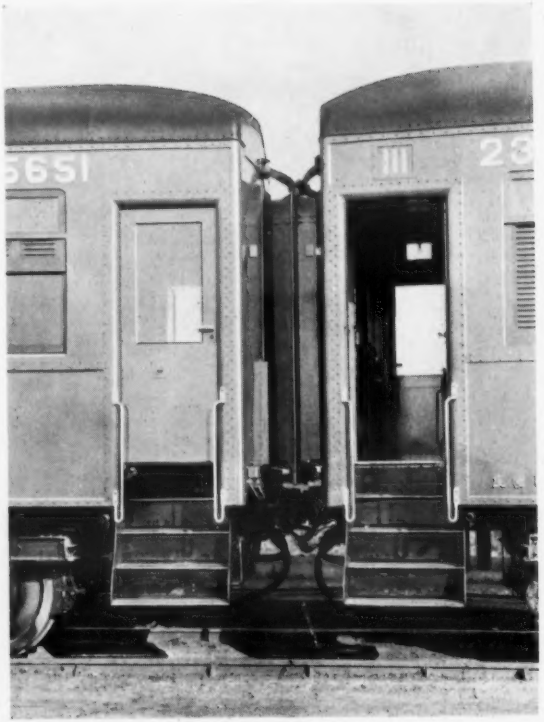
THE PREVENTION OF FRUIT DECAY DURING TRANSIT.—Keeping strawberries in perfect condition from the time they leave the growing fields at Wisbech (Cambridgeshire) until they reach their destination hundreds of miles away, is a problem which has received attention by the L.M.S.R. on which strawberry traffic is now in full swing. Strawberries are picked in a temperature frequently above 80° F. in the shade, and the heat that ripens the fruit before packing, results in deterioration afterwards. As a result of experiments, the L.M.S.R. discovered that the best way to prevent decay was to cool the fruit immediately it came into its hands, and to keep it in such a condition until it reached its destination. Arrangements have, therefore, been made for the rail vehicles (in which the growers load the strawberries) to be pre-cooled by the use of dry ice (solid carbon dioxide). When the loading is completed, more dry ice is added, and the vehicle which is thus well insulated, is then sealed and sent to its destination. As a result the fruit is both cool and firm when it is unloaded, although the journey may have been accomplished in the hottest weather.

New Belgian-built all-steel coaches for the Lung-Hai Railway, China

(*See Overseas paragraph on page 59*)

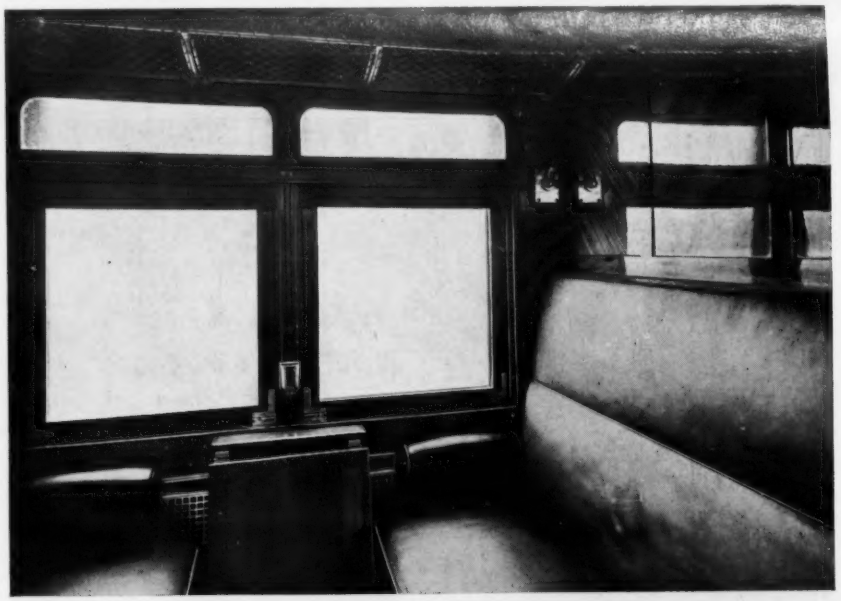
Right: First class dining car





The two views on the left show the steel vestibule connections of the new coaches. On the right is the interior of a first class compartment

Above : Second class compartment ready for night use

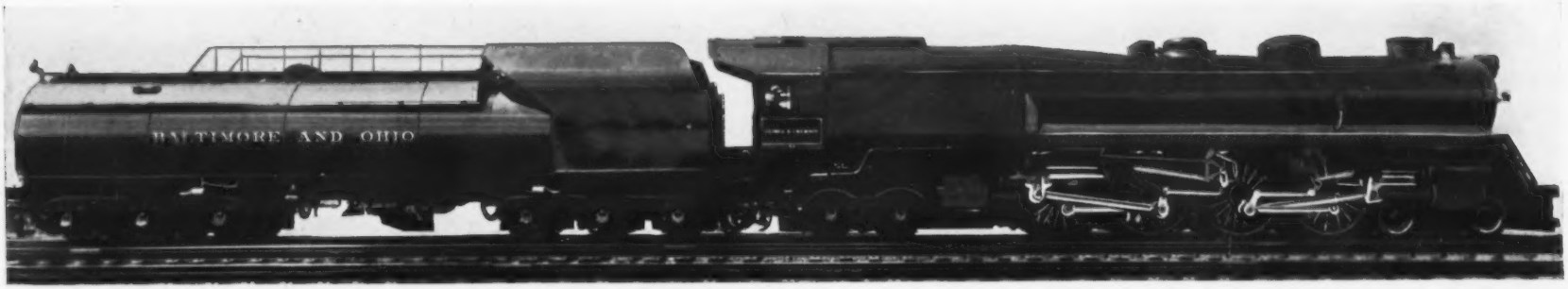


Above : Second class compartment converted for day use

Left : A first class compartment with berths ready for occupation

Right : Compartment for train staff

INTERIOR VIEWS OF THE NEW COACHES



New 4-4-4-4 passenger locomotive "George H. Emerson," Baltimore & Ohio Railroad *(see editorial note on page 51)*

These views give striking evidence of the high standard of comfort and the amenities of third class travel on the Swedish State Railways. The left-hand picture was taken in a coach fitted with a pantry compartment for the service of tea, coffee, and light meals; that on the right hand shows the refreshment counter of a buffet car

RAILWAY NEWS SECTION

PERSONAL

The Rt. Hon. Sir John C. C. Davidson, P.C., G.C.V.O., whose family has been connected with Argentina for over 100 years, has been elected a Director of the Bahia Blanca Railway Co. Ltd.

Mr. E. MacVe, Transport Manager of the Bleachers' Association Limited, has been appointed Assistant Manager of the Northern Ireland Road Transport Board.

We regret to learn of the death, on July 3, of Mr. C. H. Eden, Secretary and Director of B. E. N. Patents, Limited.

Mr. S. J. Hungerford, Chairman and President of the Canadian National Railways, was on June 14 awarded the honorary degree of Doctor of Mechanical Engineering by the University of Vermont, in recognition of his notable work in restoring the Central Vermont Railway after the floods in 1927. On June 15 Mr. Hungerford was presented in Montreal with an honorary membership of the Engineering Institute of Canada.

We regret to record the death in Peiping, on May 17, of Lt.-Gen. Dmitri Horvath, builder and first General Manager of the Chinese Eastern Railway, at the age of 76. Born in the Imperial Palace, Zimni, in St. Petersburg, he was a descendant of the ancient Slavonic family of Horvathians; he graduated from the Military Engineering College in that city. At the end of the last century General Horvath built the Chinese Eastern, and was for 20 years its General Manager until the revolution in 1917. The city of Harbin was planned and built by him. When the revolution broke out, he was not dismissed like the other dignitaries in the Far East, but was appointed High Commissioner in Manchuria. He, however, became a leader of the White Russians, and was Governor-General of the Russian Far East under Admiral Kolchak's Omsk Government. General Horvath proceeded to Peiping in 1920, and was appointed High Adviser to the board of directors of the C.E.R. He had extraordinary and widespread influence in the Far East, and was exceedingly popular with all communities.

M. Georges Legoux, whose appointment as General Manager of the French State Railways in succession to M. Raoul Dautry was announced in THE RAILWAY GAZETTE of June 25, is a former pupil of the Ecole Polytechnique, and of the Ecole des Ponts et Chausées, and had his early engineering experience at Rennes. In 1924, at the age of 29, he entered the Operating Department of the Eastern Railway of France, achieving rapid promotion, which led to his appointment at the beginning of this year as Ingénieur en Chef Adjoint. The Decree naming him as General Manager of the State Railways was signed by the French President on June 18.

M. Georges Legoux
Appointed General Manager, French State Railways

The Canadian Pacific Railway announces the retirement of Mr. William Fulton, Assistant General Passenger Agent, Ontario District. Mr. Fulton has a record of 46 years service with the C.P.R. His place is taken by Mr. C. B. Andrews, who advances from District Passenger Agent, Ontario District, Toronto. Mr. G. D. Brophy is appointed to the position vacated by Mr. Andrews.

The late Mr. Alexander Wilson, whose death on May 5 was reported in THE RAILWAY GAZETTE of May 7, left estate valued at £18,711 (£18,400 net).

L.M.S.R. APPOINTMENT

The following appointments have been approved by the directors:—

Mr. H. Rudgard, Assistant Divisional Superintendent of Operation, Derby, to be Divisional Superintendent of Operation, Derby.

Mr. J. W. Watkins, Assistant Divisional Superintendent of Operation (Traffic), Derby, to be Assistant Divisional Superintendent of Operation, Derby.

Captain W. L. Sinclair, Marine Superintendent & Harbour Master, Holyhead, to be Assistant Marine Manager, Euston.

Captain K. N. Mackenzie, Assistant, Marine Manager's Office, Euston, to be Marine Superintendent and Harbour Master, Holyhead.

Mr. D. H. Tomlinson, Senior Clerk (Revenue Section—Coal), Chief Commercial Manager's Office, Euston, to be Mineral Agent, Euston.

Mr. E. Bullard, Assistant District Controller, Willesden, to be District Controller, Rugby.

Mr. A. S. Kirby, Assistant to District Controller, Willesden, to be Assistant District Controller, Willesden.

Mr. A. Murdoch, Engineering Assistant, District Engineer's Office, Glasgow, to be Assistant to District Engineer, Glasgow.

Mr. J. Howarth, Senior Assistant (Testing) Signal & Telegraph Engineer's Office, Euston, to be Assistant (Telegraphs), Divisional Signal & Telegraph Engineer's Office, Manchester.

Mr. J. Graham, Goods Agent, Kinning Park, to be Goods Agent, Eglinton Street.

Mr. C. S. Longsdale, Running Shed Foreman, Speke Junction, to be Assistant District Loco. Superintendent, Edge Hill.

Mr. J. F. K. Davidson, Loco. Foreman, Dundee, to be Loco. Foreman, Greenock Ladyburn.

The King has been pleased to award the Imperial Service Medal to the following members of the Tasmanian Railway Department: Messrs. S. J. Anderson and B. W. McGuire (Re-

pairers); Mr. D. Shaw (Chargeman); Mr. J. L. Torrento (Ganger); Mr. F. A. Weaver (Storeman); and Mr. R. Wright (Foreman).

Mr. E. D. Grasett, who, as announced in our issue of July 2, is retiring from the post of Divisional Superintendent of Operation, Derby, L.M.S.R., was educated at Lancing College and entered the service of the Manchester, Sheffield & Lincolnshire Railway under Mr. Haig Brown, then Superintendent of the Line. After experience in the fares and rates office and at stations he was transferred to the Goods Train Department, giving

Mr. E. D. Grasett, O.B.E.,

Who is retiring from the position of Divisional Superintendent of Operation, Derby, L.M.S.R.

attention to working at most of the large yards on the system. When the Great Central extension to London was opened, he was appointed Chief Clerk to the District Superintendent at Leicester. In 1903, Mr. Grasett was appointed Outdoor Assistant to the Traffic Superintendent of the North Staffordshire Railway, holding that position until, in November, 1913, he was appointed Assistant to the General Manager. In April, 1914, he became Traffic Superintendent, a position which he held until the formation of the London Midland & Scottish Railway, when he became Superintendent of the North Staffordshire Section. In January, 1924, he became temporary Assistant to the Chief General Superintendent at Derby. He was appointed Divisional Superintendent, Derby, in January, 1927, and in May, 1929, became Assistant to Chief General Superintendent (Discipline), Derby, which position he held until appointed Divisional Superintendent of Operation in 1932. Mr. Grasett was awarded the O.B.E. during the war. He is a Member of the Institute of Transport; a Member of Council for the past three years; and was awarded the gold "Railway Operating Medal" for his paper "Freight Train Operation" delivered before the members of the institute in London on March 13, 1933.

We regret to record the death at Diddington Hall, Meriden, on July 1, after a short illness, of Mr. Bernard Powell-Brett, Chairman of Brett's Patent Lifter Co. Ltd.

Vickers Limited announces that General the Hon. Sir Herbert A. Lawrence, G.C.B., has expressed his desire to resign his seat on the board of the company. The board has expressed its great regret and accepted General Lawrence's resignation with effect from June 30, 1937. Mr. J. Reid Young, C.A., has been appointed a Director. Mr. Reid Young has been Secretary of the company since 1929 and will continue to hold that office.

The Board of Directors of the Northern Alberta Railways Company has appointed Mr. J. M. MacArthur to be General Manager of the company at Edmonton, succeeding Mr. John Callaghan, who retired on July 1. Mr. MacArthur will report to the Operating Committee of the company, which consists of Mr. A. E. Warren, Vice-President in charge of the Western Region of the Canadian National Railways, and W. M. Neal, Vice-President, Western Lines, Canadian Pacific Railway.

From *The London Gazette* of July 2: Regular Army Reserve of Officers, Royal Engineers, Transportation: Lieut.-Col. and Bt.-Col. H. A. Short, M.C. (Assistant Docks and Marine Manager, Southampton, Southern Railway), from Supplementary Reserve of Officers, Royal Engineers, Transportation, to be Lieut.-Col. and Bt.-Col., retaining his present seniority (July 1).

Supplementary Reserve of Officers. Royal Engineers, Transportation: Major A. B. Chester (Divisional Engineer, Central, Southern Railway), to be Lieut.-Col. Capt. L. J. M. Knotts (Signals & Telegraph Department, Southern Railway), to be Major. Lieutenant N. E. V. Viner-Brady (Chief Engineer's Office, Southern Railway) to be Captain. Second Lieutenants A. J. Clarkson, T. D. Burdis, to be Lieutenants (July 1). F. J. Ivimey to be Second Lieutenant.

CANADIAN NATIONAL APPOINTMENTS

Mr. Norman J. Thompson, a native of Arbroath, Scotland, has been appointed Chief Commissioner of Industries, Canadian National Railways, with office at Montreal. The appointment is also announced of Mr. C. G. Houghton as Acting Commissioner of Industries for Canadian National Eastern Territory: Mr. Houghton was born at Stroud Green, Middlesex. Also Mr. Stinson O. Martin has been appointed General Superintendent, Canadian National Express Company, with office at Toronto, Ontario, and Mr. W. T. Ritchie, who was born at Aberdeen, Scotland, has been appointed Traffic Supervisor at Montreal, a new position. Mr. C. V. Stapleton, Manager of Office Services, C.N.R., was recently awarded the Leffingham Medal for outstanding accomplishment in the field of office management. This was the first time the medal had been awarded to a railwayman.

Mr. H. Rudgard, who, as announced in our issue of July 2, has been appointed Divisional Superintendent of Operation, Derby, L.M.S.R., in succession to Mr. E. D. Grasett, entered the service of the former Midland Railway in 1900, as a pupil under the late Mr. S. W. Johnson. After going

Mr. H. Rudgard,

Appointed Divisional Superintendent of Operation, Derby, L.M.S.R.

through the various workshops, he obtained six months' firing experience before entering the drawing office, and was later appointed to be District Locomotive Superintendent at Skipton, at Derby, and at Plaistow (London Tilbury & Southend Section). Mr. Rudgard was called up in the Territorial Army in 1914, and served for 20 months in the trenches, being later attached to the Royal Engineers, Light Railway Section, as Superintendent of the Light Railways, 4th Army, afterwards commanding the Light Railway Workshops, Beaurianville, B.E.F., and Carriage and Wagon Depot, Audruicq, B.E.F. He retired from the Army with the rank of Lieut.-Colonel. During service in France and Belgium he was twice wounded, and on two occasions was mentioned in despatches. In 1919 Mr. Rudgard was appointed Assistant Superintendent of Freight Trains, Midland Railway, Derby, and on the grouping of the companies was appointed Assistant to the Motive Power Superintendent, L.M.S.R., Derby. In February, 1932, he became Divisional Superintendent of Motive Power (Midland Division), Derby, and was appointed Assistant Divisional Superintendent of Operation, Derby, in June, 1935. In 1923 Mr. Rudgard was

appointed to serve on a committee at the War Office to deal with the formation of the Supplementary Army Reserve, and in 1925 received a commission in the Land Forces as Lieut.-Colonel. He is an Associate Member of the Institution of Mechanical Engineers, a Member of the Institution of Locomotive Engineers, and a Member of the Institute of Transport.

Mr. Owen T. Wood, M.Inst.C.E., Telegraph and Signals Superintendent, Central Argentine Railway, sailed for England on leave on May 27.

We regret to record the death on July 2 of Mr. Ernest Pendarves Leigh-Bennett (also known as "Dell Leigh") at the age of 55. The elder son of Mr. Ernest Leigh-Bennett, he belonged to the ancient family of that name, formerly of Thorpe Place, Surrey, and now of Donnington Grove, Newbury. He was born on June 17, 1882, and was educated at Lancing. In the war he had a long service in the R.A.F. He was made M.B.E. The funeral took place at Kensington cemetery, Gunnersbury, on Tuesday. An appreciation of Mr. Leigh-Bennett's work as an outstanding popular writer on railway subjects forms the topic of an editorial note on page 49.

COLONIAL SERVICE CHANGES

The Secretary of State for the Colonies has recently approved the following appointments:—

Mr. D. H. Dillow, Traffic Assistant, Federated Malay States Railways, to be Traffic Officer, Transport Licensing Board, Malaya.

Mr. J. R. Farquharson, Senior Assistant Engineer, Kenya and Uganda Railways and Harbours, to be Personal Assistant to the General Manager, Tanganyika Railways.

Mr. E. Lamberty, Chief Controller, to be Traffic Superintendent, Transportation Branch, Railway Department, Mauritius.

Mr. J. Lawson, Stock Verifier, Public Works Department, Sierra Leone, to be Superintendent of Stores, Palestine Railways.

Mr. F. G. Taylor, Telegraph Engineer, Railway Department, to be Wireless Engineer and Broadcast Officer, Sierra Leone.

We regret to note the death at Wimbledon, on June 8, of Col. Sir Buchanan Scott, K.C.I.E., at the age of 87. After the usual training at the Royal Military Academy, Woolwich, he was gazetted to the Royal Engineers in 1871, and went out to India two years later. There he did conspicuous work on frontier railways, was Deputy Consulting Engineer for Railways, and in 1888 was honoured with the C.I.E. for his services. Subsequently he was in charge of the first Zhob Valley survey, and other surveys in that area. He was afterwards Senior Mint Master at Calcutta, and received the K.C.I.E. at his retirement as full Colonel in 1905.

SOUTH AFRICAN APPOINTMENTS

The following appointments are announced by the South African Railways & Harbours:—

Mr. H. Cheadle, Chief Traffic Manager, to be a Member of the Railways and Harbours Service Commission in succession to the late Mr. A. Carney.

Mr. D. H. C. Du Plessis, Private Secretary to the Minister of Railways and Harbours, and Secretary to the Railway and Harbour Board, to be Superintendent, Special Duties, Parliamentary, in succession to Mr. R. R. Macgregor, retired.

INDIAN RAILWAY STAFF CHANGES

Mr. A. J. Cracknell, Deputy Chief Mechanical Engineer, G.I.P.R., retired on April 2, after 25 years' service on that line. He has been granted leave for one year and seven months, preparatory to retirement.

The Hon. H. T. de B. Bingham has been appointed to officiate as Chief Engineer, N.W.R., as from April 10.

Mr. R. P. Varma has been appointed to officiate as Deputy Chief Engineer, N.W.R., as from April 10.

Rai Bahadur B.D. Puri has been appointed to officiate as Chief Accounts Officer, N.W.R., as from April 12.

Mr. L. P. Misra has been appointed Deputy Chief Engineer, E.I.R., in a provisionally permanent capacity, but will continue to be employed as Divisional Superintendent.

Mr. O. G. Edwards, Controller of Stores, G.I.P.R., has been granted 3½ months' leave as from April 13.

Mr. H. M. Walker, has been appointed to officiate as Deputy Chief Mechanical Engineer, N.W.R., as from April 15.

Mr. R. T. Power was appointed to officiate as Traffic Manager, Mr. G. W. D. Beaman as Deputy Traffic Manager (Transportation) and Mr. E. I. Milne as Deputy Traffic Manager (Mechanical), Burma Railways, just prior to their separation from India.

Mr. F. H. L. Strange, Deputy Chief Mechanical Engineer, N.W.R., has been granted leave preparatory to retirement for two years and four months, as from April 12.

We regret to record the death on May 30 of Mr. Allan Cameron, Oriental Manager of the Canadian Pacific Railway until his retirement five years ago; he died at Vancouver, B.C., at the age of 75. Born in Owen Sound, Ontario, Mr. Cameron joined the Canadian Pacific Railway in Winnipeg in 1883, but was transferred to the Pacific Coast four years later. From 1901 to 1905 he was General Agent of the Portland and Asiatic Steamship Company in Hong Kong. After serving as General Superintendent in Calgary for the Canadian Pacific Railway's Department of Natural Resources, he returned to Hong Kong in 1922 as Oriental Manager.

STAFF AND LABOUR MATTERS

N.U.R. Annual Meeting

The annual delegate meeting of the National Union of Railwaymen opened at Plymouth last week-end. On Sunday afternoon, July 4, Mr. Marchbank addressed a mass meeting. He expressed optimism regarding the outcome of the claims of the union shortly to be heard by the Railway Staff National Tribunal, and declared that railwaymen could be certain that the best possible claim would be presented. Mr. W. T. Griffiths, President of the union, who presided, said he regarded the claim for a 50s. minimum wage as one of the most courageous the union had taken for a long time.

In his presidential address on Monday, July 5, Mr. Griffiths said that the demand of the railway men for increases in wages was in no way dependent on the result of the companies' application to the Railway Rates Tribunal to raise rates and fares. It was based on the improved financial position of the companies, which had been brought about largely by economies at the expense of their members. Our claim for a 50s. minimum wage," he said, "is based on the indisputable fact that it is impossible, with present day standards, for any man to provide for a wife and family anything like a reasonable standard of decency and comfort, to which every worker is entitled, on less than this sum per week. I have every confidence," he continued, "in the justice of our claims, and the ability of our advocate. I trust that we may be able to secure satisfaction by reasoned argument and persuasion, but I must warn our members that whatever the tribunal's decision may be, the responsibility for accepting or rejecting it rests with them."

Mr. Griffiths said that there was much truth in the complaint that there was unfair road competition, and that sweated labour was being used to cut rates. The railwaymen, however, could not allow this to be used as a reason for the wages of lower-paid grades to remain where they were. If, through road competition, the railways could not pay wages that would guarantee a reasonable standard of life, it was time that the Government stepped in and nationalised not only the railways but all forms of transport. "If that were done," he said, "a much more efficient service could be given the public by a properly co-ordinated transport system, and the workers be guaranteed good wages and conditions. By proper control of heavy road traffic, much of which could be carried by rail, the roads of this country would be made far more safe than they are today."

The Institute of Transport Visit to Germany

(*From our special correspondent*)

In last week's issue some account was given of the progress of this visit up to the time of the departure from Berlin on July 1. The tour is now in its final stages and yesterday the party arrived at Coblence whence after a short stay it will proceed to Cologne, the last city in Germany to be visited. It is due to return to London on Sunday next (July 11) by the Ostend—Dover service, reaching Victoria station at 4.20 p.m.

Herr Direktor Hennch of the German State Railways met the party on its arrival at Nuremberg and on behalf of Dr. Geyer, the President of the Nuremberg section of the Reichsbahn (who was absent from the city on urgent business), delivered an address of welcome. He mentioned that 102 years ago Nuremberg was the first city in Germany to establish a railway, that the first locomotive, *Der Adler*, was constructed in Stephenson's factory at Newcastle, and that the first engine-driver was William Wilson, an Englishman who ultimately settled in Nuremberg. On the occasion of the railway centenary his grave in St. John's Cemetery was adorned with flowers. Herr Hennch paid a tribute to the assistance received from Great Britain and said that the sound development of the German railways had created an undertaking with 660,000 employees, 23,000 locomotives, and a network of lines extending to 54,000 km. Mr. E. C. Cox, on behalf of the visitors, acknowledged Herr Hennch's welcome. On the following day (July 2) there was a further address of welcome from the Oberbürgermeister of Nuremberg. This was given in the magnificent Great Hall at the Rathaus and was suitably acknowledged on behalf of the Institute by Mr. D. Ross-Johnson.

Two other outstanding events in Nuremberg were the visits to the Transport Museum and to the famous mediæval town of Rothenburg-ob-der-Tauber. It would be impossible to attempt to describe in a small compass the wide range of exhibits in the museum, nor was the party able to see them all in the time at its disposal. They cover the development of railways and postal communications and of the new State Motor Roads which the visitors had already had the opportunity of observing when travelling over the one running north-east from Berlin, *en route* to the ship elevator at Niederfinow. A facsimile of the locomotive *Der Adler* was shown, and there were many exhibits to illustrate modern developments (such as automatic couplings) as well as things of the past.

Rothenberg had little of transport interest for the party, but the picturesque beauty of this old Franconian stronghold which had been a free town up to 1802, obviously made a deep impression on everyone, and the load of the special train which made the return journey to Nuremberg after dinner must have been increased by the addition of the weight of vast numbers of post-cards, photographs, guide books and etchings. One member of the party was even carrying a large amount of crockery.

Munich was reached on July 3, and almost immediately after arrival a visit was made to the German Museum, a vast collection relating to the natural science and technology. Here the development of every branch of transport was illustrated by means of models and originals, and a very interesting two hours was spent in studying these.

The rest of the programme in Munich included a tour of the city, and a visit by motor coach, via the State Motor Road, to the Chiem See (the largest of the Bavarian lakes) which the party traversed by steamer to the Herren-Insel to visit the gorgeously decorated palace built there by King Ludwig II of Bavaria in 1878-85, after the manner of Versailles. On Monday, July 5, there was a tour of Southern Bavaria, including the ascent of the Zugspitze, the highest mountain in Germany (9,730 ft.). This ascent was made by the Zugspitze Railway, an electrically operated undertaking, 12½ miles long and running from the town of Garmisch Partenkirchen to the summit of the mountain. Its construction was begun in 1928 and it was completed in 1931. The railway is of the ordinary type so far as Grainau, but there a cog-wheel section begins and carries the train to Schneefernerhaus (8,692 ft.), where amidst perpetual snow is a fine hotel owned by the railway company. Before reaching Schneefernerhaus, the train passes through a tunnel 2¾ miles long in which, at intervals, there are notice boards stating the height reached and the names of well-known places having similar altitudes. From Schneefernerhaus, the summit of the Zugspitze is reached by aerial ropeway. The return journey home to Munich from Garmisch was made via Ettal and Oberammergau, where dinner was taken and the famous theatre visited.

The party left Munich on Tuesday last (July 6) and proceeded to Wiesbaden, where it remained until yesterday.

The Swanley Junction Accident

Mr. W. A. Thomson, a Deputy Coroner for Kent, held an inquest on July 1 on the bodies of the four persons killed in the accident at Swanley Junction, Southern Railway, on June 27. Through Mr. Howard Burt, solicitor, the railway company acknowledged legal responsibility. The station foreman, W. T. Langridge, said that the 9.30 p.m. from Ashford, due to pass Swanley at 10.52 p.m., and the 10.0 p.m. from Gillingham, were both running late, and he decided to stop the former and allow passengers from the latter to join it. He made that clear to the Yard box and Junction box signalmen, but crossing the footbridge he noticed the Ashford train going too fast to stop at the up branch starting signal and shouted to the driver. The train ran on into the siding, as the facing points were set that way to act as a trap to protect the up main, on which was the other train. A. Anthony, signalman at Swanley Yard, said the Ashford train was accepted and passed in the usual way, but a minute later he heard it had run into the siding. He obeyed all his regulations. A. Morgan, fireman of the train, said their next stop should have been Bromley South. Swanley Junction box distant signal was on, and the driver applied the brakes gently. Morgan shouted after passing the signal, but thought the driver did not hear him. He did not see the platform starting signal until they were nearly on it. The speed he thought was about 20 m.p.h. B. Reeves, signalman at the Junction box, said he assumed that the Yard box would check the train. It was really a breach of rules for him to accept a train not booked to stop with the points set for the siding. W. A. Godwin, guard of the train, said he noticed the Junction box distant on and assumed there was a train in the section ahead, as he did not know they were to stop in the station. H. J. Asplin, driver, said Swanley Yard distant and home signals were off, but he did not notice the Junction distant, so acted as if it were on. He was not checked at the Yard box, and was surprised to find the platform signal against him. He then made a full brake application. He had had no instruction that he was to stop at Swanley.

A verdict of "accidental death" was returned with a rider that "proper instructions of an alteration in train service should be forwarded to the driver and guard at least at the preceding stopping station," and the Coroner pointed out that this was the general practice. The jury asked that attention be drawn to the up branch line signalling at Swanley.

THE CORONATION TRAIN, L.N.E.R.—In the article on the new L.N.E.R. Coronation train which we published last week, the decorative schemes of the new rolling stock should have been attributed to Mr. Murray Adams-Acton, of Acton Surgey Limited.

The Permanent Way Institution Summer Convention at Southport

The annual summer convention of the Permanent Way Institution was held this year with Southport as its centre, from July 3 to 8. The proceedings opened at the Town Hall with the summer meeting at which the Mayor of Southport accorded the delegates a civic reception. After the balance sheet (which showed the financial position of the institution to be very satisfactory) had been adopted and the presentation of medals and book prizes made, Mr. W. Hepworth, District Engineer, Blackburn, L.M.S.R., read a short paper on features of railway engineering interest in the Southport area. The annual summer dinner was held in the evening at the Victoria Hotel, Mr. W. K. Wallace, Chief Engineer of the L.M.S.R. and President of the institution, occupying the chair. Among those present were:—

The Mayor of Southport, Alderman Wood, Councillor Geldard, and Messrs. Alley, Box, Butland, Dashper, Doré, Fairhurst, Fletcher, Gairns, Gibson, Grieg, Harrison, Hepworth, Janes, Johnstone, Kerrigan, Lawson, Leach, Marrian, McLewin, Melville, Ratter, Russ, Shaw, Sherrington, Tofts, Tustain, Wynn-Williams, Willox.

Mr. G. A. Leach, of the British Oxygen Co. Ltd., proposed the toast of "The Permanent Way Institution" and said that high speeds such as were recently attained by the Coronation Scot could be achieved only by the provision of a first class track, and the question of speeds generally was therefore one for civil as well as mechanical engineers; it was only by the closest co-operation between them that the desired progress could be accomplished. Recent activities had brought him into close contact with the civil engineering staffs, and he had been astonished at the rapidity with which the work of track maintenance was carried out. It was the privilege of certain non-railwaymen to be associated in a minor capacity with those responsible for this work, and their further co-operation could be relied upon.

Mr. W. K. Wallace, responding to the toast, said that if the permanent way was not maintained so that smooth running could be given, traffic would quickly decline. The Commercial Department had found that there was a ready sale for speed, and the Operating Department was providing the means of sale, but it was upon the permanent way staff that the responsibility devolved of supplying and maintaining tracks suitable for the present heavy weights and high speeds. Trains such as the Coronation Scot needed an exceptionally good road, and this requirement had to be met with due regard to economy. One of the great advantages of the Permanent Way Institution was that it provided an opportunity for those engaged on the important work to which he had referred, to meet and exchange views on the best means of solution of the problems which arose in the course of their work. The term "permanent way" was something of a misnomer, and it was certainly not as permanent as could be desired. For this reason it was necessary that the efforts of the permanent way staff should be directed not only towards the initial provision of a good road, but in addition a road which would remain good with a minimum of attention. Sectional meetings formed the backbone of the institution's work, and in visiting the various local sections he had been very interested in the papers read and the discussions which had followed. Even those members who were not attached to a section could derive much knowledge from a study of the contents of the Journal. Research by large commercial firms had been of considerable assistance to the railway companies and in particular the introduction of welding was helping towards the provision of high-quality running.

Mr. K. C. Marrian, District Engineer, Manchester (Exchange), L.M.S.R., proposed "The Mayor and Corporation of Southport," and Councillor H. W. Barker, J.P. (Mayor), responded. The toast of "Our Guests" was submitted by Mr. R. W. Gairns, District Engineer, Glasgow (Central), L.M.S.R., and replied to by Mr. C. Johnstone, Traffic Manager, Liverpool, L.M.S.R.

During the convention, several visits to engineering works and places of interest were arranged, among which were the R.M.S. *Duchess of Athol*, Liverpool Cathedral, Liverpool Overhead Railway, the Mersey Railway's power station at Birkenhead, Lever Brothers' Port Sunlight works, Bryant & May's match works, the British Insulated Cables Company's Prescot works, and Wyre Dock harbour. The visit to the Liverpool Overhead Railway, which took place on Monday morning, was of particular interest in that this railway is one of the few remaining independent concerns and provides an example of the efficiency that can be achieved even with equipment that is not right up-to-date when there is a close and intimate link maintained between the management and the personnel.

The visitors were shown over the workshops at Seaforth Sands where they saw the maintenance of the rolling stock being carried out in every stage, and where also demonstrations were provided of the driving and braking of trains, as well as the functioning of the train stops with which this line is equipped. Permanent way is also dealt with at Seaforth Sands shops and a demonstration had been arranged by the British Oxygen Co. Ltd., of the repair of a crossing by the oxy-acetylene welding process. The welding of bonds on the running rails and on conductor rails was also demonstrated.

Under the guidance of Mr. W. L. Box, the Manager, the party travelled from Seaforth Sands to James Street station. From the railway a splendid view of the docks is obtained and the efficiency of the service and the comfort and cleanliness of the rolling stock, which has recently been modernised internally; were appreciated. With the use of the two-aspect colour-light signalling and train stops the services work with almost complete reliability in every condition of weather.

On alighting at James Street station the party went by the Mersey Railway to that company's power station at Hamilton Square, Birkenhead. This station has many points of interest, among which may be mentioned the pumping plant that removes some 4,800 gallons of water a minute from the tunnel continuously. The power station supplies traction current for the railway, which was electrified in 1903, the first in the country to change over from steam to electric traction; previously it had been operated by steam since its opening in 1886. The members returned to Liverpool Central (Low Level) station to see the up-to-date signalling and the automatic points for working the trains in and out of the station. As Mr. J. Shaw, General Manager and Engineer of the Mersey Railway mentioned, it is a remarkable fact that although there was much scepticism as to the safety of installing such equipment, since these points were put into service in February, 1923, there have actually been fewer failures than with manual working.

Another instructive feature of the convention was a film with a running commentary shown by the British Oxygen Company entitled "Oxy-acetylene Welding Applied to Railway Track Work."

Forthcoming Meetings

July 12 (*Mon.*).—**Leopoldina Railway Co. Ltd.** (Ordinary General), Southern House, Cannon Street, E.C., at noon.

July 21 (*Wed.*).—**Bombay, Baroda & Central India Railway Company** (General), Southern House, Cannon Street, E.C.4, at 1 p.m.

July 23 (*Fri.*).—**Egyptian Delta Light Railways Limited** (Annual Ordinary General), Winchester House, Old Broad Street, E.C., at noon.

NEW TICKET AND CHANGE-GIVING MACHINES.—Leicester Square station, London Transport, is now equipped with the latest type of ticket and change-giving machine. Twenty-four of these machines, in batteries of six, were brought into service on June 25. These machines print and deliver a ticket for any fare from 1d. to 6d. The exact fare in pennies or halfpennies may be placed in the machine, but if 6d. or 1s. be inserted the correct change is shot out in advance of the tickets.

Inaugural Journeys of Streamlined L.N.E.R. Coronation and L.M.S.R. Coronation Scot Trains

Successful journeys were made by the new L.N.E.R. streamlined train Coronation and the L.M.S.R. Coronation Scot on their first public journeys on Monday last, July 5. The Coronation had the harder task, in view of its faster timing (65·5 m.p.h. overall as compared with the 61·8 m.p.h. of the Coronation Scot), and heavier load (312 as against 293 tare tons), and particularly so south of York. The down journey of July 5 proved, however, that the King's Cross—York booking of 157 min., which requires a start-to-stop average of 71·9 m.p.h., and is identical with that of the Silver Jubilee over this stretch, can be maintained without difficulty by the streamlined "A4" Pacifics with a load over 40 per cent. heavier than that of the latter train; and despite a bad permanent way check at Grantham, York was reached 1½ min. early, in 155 min. 36 sec. gross, or, allowing for the Grantham permanent way check, but not the severe service slacks at Peterborough and Selby, 154½ min. net—a net start-to-stop average of 73·3 m.p.h.

Outstanding features of the King's Cross—York run were the maxima of 94 m.p.h. at Arlesey and 98 m.p.h. at Connington, near Holme; and the averages of 89·3 m.p.h. over the 19·8 miles from Hitchin to St. Neot's, 84·5 m.p.h. over the 57·3 miles from Hatfield to Fletton junction, Peterborough, and 77·8 m.p.h. net for the 160·3 miles from Potter's Bar to Brayton junction, Selby, inclusive in the last case of the Peterborough slowing. Remarkable uphill work was also performed, notable feats being the average of 81·2 m.p.h. up the long incline from Tallington to Stoke summit, with a minimum of 76½ on the 4½ miles at 1 in 200 to Corby; there was also no lower speed than 76½ m.p.h. on the 1 in 200 sections of the ascent to Markham summit. After the slack over Scrooby water-troughs, matters were taken more easily, and though Doncaster was passed 3¼ min. early (124 min. net for the 156 miles from King's Cross), the arrival at York was a bare 1½ min. early. Here, with the station full of sightseers, opportunity was taken by the staff to broadcast through the station loudspeakers some interesting information about the train.

Owing to the restricted speed between York and Darlington, followed by the succession of pitfall slowings between Ferryhill and Newcastle, there was little of interest to record, and north of Newcastle the timings were found to require of the locomotive a considerably less strenuous effort than those south of York. Indeed, the only further running of note was the sustained 69 m.p.h. up the sharply-curved 1 in 200 ascent to Grantshouse (including 5¼ miles at 1 in 200, and begun at a speed no higher than 71½ m.p.h.), followed by 95 m.p.h. in the descent of Cockburnspath bank. There was a gain of 3½ min. on schedule from Newcastle to Dunbar, but matters were then again taken easily, and Edinburgh was reached a minute early, in 199 min. 10 sec. for the 204·5 miles from York, at 9.59 p.m. Mr. William Whitelaw, Chairman of the L.N.E.R., and Sir Nigel Gresley, Chief Mechanical Engineer, were passengers on the inaugural down run. Comment in the train was general on the smoothness of the running at high speed, and the luxury of the internal equipment, the observation car in particular being much favoured by passengers. A matter of interest on the down journey is the fact that the Coronation and the heavy 4 p.m. express to Leeds and Newcastle are booked to leave King's Cross simultaneously, the latter using the slow road and being turned to the fast line at Finsbury Park No. 5, when the lighter Coronation has drawn well ahead. This has never been done previously with two express departures from King's Cross.

After the demonstration high-speed journey with the L.M.S.R. Coronation Scot on the previous Tuesday, the timing of the latter proved relatively easy, and south of Carlisle the only notable features of the inaugural down journey on Monday last were a very

L.N.E.R. "CORONATION"—KING'S CROSS TO YORK
Inaugural Down Run, July 5, 1937
Engine: 4-6-2 No. 4491, *Commonwealth of Australia*
Driver, T. Dron; Fireman, G. Charlton (Gateshead)
Load, 9 cars, 312 tons tare, 325 tons gross

Distance		Sched.	Actual	Speeds
Miles		Min.	Min. Sec.	M.p.h.
0·0	KING'S CROSS ..	0	0 00	—
2·5	FINSBURY PARK	—	5 06	—
5·0	Wood Green ..	—	7 33	—
12·7	Potter's Bar ..	—	14 37	67
17·7	HATFIELD ..	18½	18 25	86½
23·5	*Woolmer Green* ..	—	22 36	80½
28·6	Stevenage ..	—	26 28	90/†67
31·9	HITCHIN ..	29½	28 56	88
37·0	Arlesey ..	—	32 15	94
44·1	Sandy ..	—	37 03	90
51·7	St. Neots ..	—	42 15	83½
56·0	Offord ..	—	45 22	90/*70
58·9	HUNTINGDON ..	48½	47 40	80½
62·0	*Milepost 62* ..	—	50 07	75
69·4	Holme ..	—	55 07	‡98
75·0	*Fletton Junction* ..	—	59 08	§85
76·4	PETERBOROUGH ..	63½	61 20	*21
79·5	*Werrington Jc.* ..	—	65 16	—
88·6	Essendine ..	—	72 04	85
97·1	Corby ..	—	78 21	76½
100·1	*Stoke* ..	—	80 48	68
105·5	GRANTHAM ..	87½	85 17	75
			p.w.s.	30
109·7	Barkston ..	—	89 56	—
120·1	NEWARK ..	99½	97 08	90/†70
126·4	Carlton ..	—	101 58	85
131·9	*Markham* ..	—	107 16	‖76½
138·6	RETFORD ..	114½	110 58	88/*67
143·9	Ranskill ..	—	115 08	86½/†65
151·3	Rossington ..	—	121 16	71½
156·0	DONCASTER ..	128½	125 11	*65
160·2	Shaftholme Jc.	132	128 42	—
166·0	Balne ..	—	133 15	81
173·0	*Brayton Jc.* ..	—	139 10	—
174·4	SELBY ..	144	140 50	*30
181·1	Escrick ..	—	147 43	—
186·2	*Chaloner's Whin Jc.*	—	152 13	*55
188·3	YORK ..	157	155 36	—

* Service slack. † Slack for water troughs. ‡ At Connington. § Before shutting off steam. ‖ Minimum at Dukeries Junction.

L.N.E.R. "CORONATION"—YORK TO EDINBURGH
Inaugural Down Run, July 5, 1937
Engine: 4-6-2 No. 4491, *Commonwealth of Australia*
Driver, H. Hutchinson; Fireman S. Jobling (Gateshead)
Load, 9 cars, 312 tons tare, 325 tons gross

Distance		Sched.	Actual	Speeds
Miles		Min.	Min. Sec.	M.p.h.
0·0	YORK ..	0	0 00	—
11·2	Alne ..	—	11 41	72½
22·2	Thirsk ..	21½	20 53	76½
30·0	Northallerton ..	28½	27 12	69
38·9	Eryholme ..	—	34 36	74/*68
44·1	DARLINGTON ..	41	39 09	*65
49·5	Aycliffe ..	—	44 22	*58
57·0	FERRYHILL ..	53	51 16	68
61·9	Croxdale ..	—	55 53	*35
66·1	DURHAM ..	65	62 18	*28
		—	p.w.s.	*24
74·7	Birtley ..	—	72 47	77½
		—	p.w.s.	*37
80·1	NEWCASTLE ..	80	81 14	*20
82·5	*Benton Bank* ..	—	86 02	—
86·0	Killingworth ..	—	89 42	57½
90·0	Cramlington ..	—	93 31	64½
94·0	Stannington ..	—	96 50	77½
96·7	MORPETH ..	101	99 37	*35
103·3	Widdrington ..	—	106 22	75/69
108·6	Acklington ..	—	110 41	79/*69
114·9	ALNMOUTH ..	117	116 04	*50
119·5	Little Mill ..	—	121 19	54
126·1	Chathill ..	—	126 36	82
131·7	Bedford ..	131½	130 56	75
138·7	Beal ..	—	136 08	85
145·8	Tweedmouth ..	—	141 47	71½/*37
147·0	BERWICK ..	145	143 57	*28
152·5	Burnmouth ..	—	151 17	55
158·2	Reston Jc. ..	157	156 08	71½
163·2	Grantshouse ..	162	160 27	69
170·7	Innerwick ..	—	166 04	95
175·2	DUNBAR ..	172	169 40	*62
186·7	Drem ..	181½	180 00	—
191·2	Longniddry ..	185½	183 53	74
198·4	*Monktonhall Jc.* ..	191½	189 25	*60
201·5	PORTOBELLO ..	195	193 29	*40
204·5	EDINBURGH ..	200	199 10	—

L.M.S.R. "CORONATION SCOT"—EUSTON TO GLASGOW
Inaugural Down Run, July 5, 1937
Engine: 4-6-2 No. 6220 *Coronation*
Driver, J. E. Copperwheat; Fireman, J. H. Blades (Camden) between Euston and Carlisle
Driver, D. Kerr; Fireman, H. Sheldon (Polmadie) between Carlisle and Glasgow
Load, 9 cars, 293 tons tare, 310 tons gross

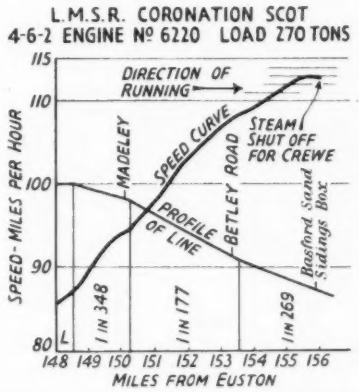
Distance		Sched.	Actual	Speeds
Miles		Min.	Min. Sec.	M.p.h.
0·0	EUSTON ..	0	0 00	—
5·4	WILLESDEN ..	9	7 56	—
17·0	WATFORD ..	20	17 50	78½
31·7	Tring ..	33	29 51	60
46·7	BLETCHLEY ..	45	42 03	80
59·9	Roade ..	56	52 43	68½
82·6	RUGBY ..	76	73 30	*37½
97·1	NUNEATON ..	90	88 37	76
116·3	Lichfield ..	107	104 38	†63½
124·3	Rugeley ..	113	111 37	—
133·6	STAFFORD ..	122	121 00	*38
147·6	Whitmore ..	135	133 16	75
158·1	CREWE ..	144	142 18	92½/*20
182·1	WARRINGTON ..	166	163 27	86/75½
193·9	WIGAN ..	178	174 42	53½/‡50
209·0	PRESTON ..	194	189 40	*26
230·0	LANCASTER ..	214	210 41	—
236·3	CARNFORTH ..	219	216 24	—
249·1	OXENHOLME ..	231	227 18	§77/61
256·2	Grayrigg ..	—	235 47	39½
262·2	Tebay ..	246	242 23	60
267·7	*Shap Summit* ..	254	251 08	32
281·2	PENRITH ..	266	262 54	*60
299·1	CARLISLE ..	283	280 29	—
8·6	Gretna ..	9	9 32	74/††63½
25·8	LOCKERBIE ..	23	24 29	82
39·7	Beattock ..	35	35 12	73
49·7	*Summit* ..	50	47 27	44
66·9	Symington ..	65	61 42	¶79
73·5	CARSTAIRS ..	71	68 09	‖32
78·5	*Craigenhill* ..	—	73 40	62½
84·0	Law Junction ..	82	78 22	75/*44
89·4	MOTHERWELL ..	88	84 17	Slacks
95·7	Newton ..	95	90 33	"
102·3	GLASGOW ..	105	99 59	—

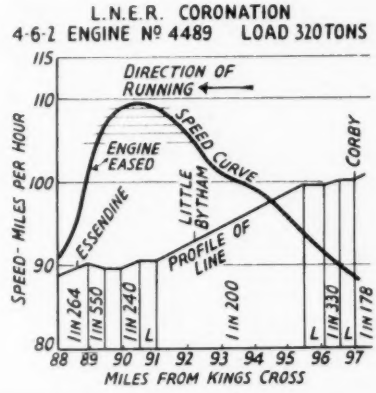
* Service slack. † At milepost 118. ‡ At Boar's Head. § At Milnthorpe. ¶ Maximum on descent. ‖ Signal check. †† Minimum at Castlemilk.

fast start from Euston to Berkhamsted, passed in 26½ min. from the start (with the help of a drop only from 78½ m.p.h. at Watford to 70 up the 1 in 335 to this point, though the engine was then eased and fell to 60 at Tring), and very fast running from Stafford to Warrington, including an acceleration to 75 m.p.h. up the gentle rise to Whitmore, 92½ m.p.h. for 2 miles near Betley Road, and 86 m.p.h. at Winsford junction. Preston was passed 4¼ min. early, and matters were then taken easily from Carnforth up to Shap summit and beyond, Carlisle being reached 2½ min. early, in 280 min. 29 sec. from Euston (64·0 m.p.h.).

From Carlisle to Glasgow, however, in view of the 1,015 ft. altitude of Beattock and the restrained running necessary through the colliery area north of Carstairs, the timing of 105 min. for the 102·3 miles is a rather more formidable proposition, and here the engine *Coronation* did some fine work, particularly in working this 315-tons load up the 10 miles from Beattock station to Beattock summit, entirely at 1 in 69—88, in 12 min. 15 sec. (49.0 m.p.h. average) with a minimum of 43 m.p.h. Indeed, 4 min. were gained from Lockerbie to Summit, which was passed in 47 min. 27 sec. from Carlisle (49·7 miles). Glasgow was reached almost exactly 5 min. early, at 7.55 p.m. Throughout the journey the speed restrictions were all observed with scrupulous care, and the running was noticeably smooth and comfortable. The engine was in charge of Driver J. E. Copperwheat from Euston to Carlisle and of Driver D. Kerr from Carlisle to Glasgow. The times on this run were recorded by Mr. R. E. Charlewood, and on that of the down L.N.E.R. Coronation by Mr. Cecil J. Allen.

The diagrams show the maximum speeds realised on the test journeys of the L.M.S.R. Coronation Scot on Tuesday, June 29, and the L.N.E.R. Coronation on the following day, with the profile of the gradients, very similar in each case, on which the maxima of 113 and 109 m.p.h. respectively were developed.





Review of Standard and Exceptional Charges

The Railway Rates Tribunal continued on July 1 the hearing of the application by the four main line railway companies for a general increase of about 5 per cent. in rates and fares. Baillie William P. Milne, a member of the Aberdeen Corporation and Chairman of the Aberdeen Fish Trades Association, opposing the application, thought that any extra charge on transport would result in a reduction of revenue to the railway companies, with a 25 per cent. reduction in landings. Road transport was not only taking its share of the existing traffic, but was developing a new traffic. The Aberdeen fish trade was today sending to London by road all the traffic it could.

The objection taken by the London County Council on July 2 was that if the companies succeeded outside London, it would tend to affect the area within. In proportion the greatest rise in the proposed increases was on workmen's tickets. For the Newspaper Proprietors' Association and the Periodical Weekly Press it was contended that the proposed increase might lead to a possibility of transfer to the road, which at present carried very little newspaper traffic. The case for Southend was that if there was an increase many people would not be able to continue to live at Southend. It was put to the witnesses that the season ticket rate between Southend and London worked out at only 0·292d. a mile, but they were looking at the total weekly amount which each person had to spend on travelling.

Sir Walter Monckton, K.C., replying on Tuesday (July 6) for the railway companies, said that they were simply accommodating themselves to the present markets. It was not the amount of the proposed increase that was in dispute, but the question of any modification in an upward direction. Agriculture should not be taken out of the scope of the application unless the tribunal was satisfied that the railways would get less revenue than they otherwise would in the 17 classes in which agricultural traffic was distributed. There was no reason to suppose that road transport was impervious to the upward trend of prices.

Continuing his reply on Wednesday (July 7), Sir Walter Monckton said it was admitted that Southend had received preferential treatment. With the increase it would still keep that preferential treatment. The same considerations which applied to merchandise traffic justified a slight raising in the general level of passenger fares. Also, there had been a growth of employment and there was more money in circulation. When workmen's fares were fixed in 1928, real wages were lower than they were now, as the cost of living had dropped between 1928 and 1936.

The inquiry then concluded. It had lasted 16 days.

The President (Mr. W. Bruce Thomas, K.C.) said that the tribunal would consider its decision and announce it as early as possible. If it was necessary to make a modification, the tribunal would probably have to request the parties to appear before it again in order that, if anything was done, the tribunal could be quite sure that what was done was in accordance with the decision which the tribunal would before that announce.

Soviet Orders Placed in the United Kingdom

The value of the orders placed in the United Kingdom in May of this year was £945,767, as compared with £903,530 in May of last year. In the first five months of this year the value of the total orders placed was £9,556,854, as compared with £3,991,288 in the corresponding period of 1936. This represents an increase of nearly 140 per cent.

The increase this year in the purchase of machinery and equipment was particularly striking. Important expansion has also taken place in the purchases of non-ferrous metals which have almost doubled, and non-ferrous ores. The orders for ferro-alloys and steel and chemicals have shown a decrease. The table below shows orders placed and purchases made in the United Kingdom for engineering and allied equipment in May and in the first five months of this year as compared with 1936.

	May, 1936	May, 1937	January-May, 1936	January-May, 1937
	£	£	£	£
Machinery and equipment ..	42,679	242,514	125,724	3,382,224
Ferro alloys and steel	158,930	4,632	194,469	32,516
Non-ferrous ores	24,293	71	32,607	218,438
Non-ferrous metals	235,489	309,738	1,280,188	2,382,338

MINISTRY OF TRANSPORT ACCIDENT REPORT

Barford, L.N.E.R.: March 18, 1937

At about 2.3 a.m. the rear vehicle of the 10.20 p.m. express York to King's Cross, 8-ton 4-wheeled perishable fish van No. 151277, became derailed as the train was approaching Barford automatic signals at 65 to 70 m.p.h. and, becoming uncoupled, stopped foul of the down main line and was struck by the 1.10 a.m. sleeping car express, King's Cross to Newcastle, running at 70 m.p.h. It was fortunately thrown clear, but woodwork penetrated the engine cab and inflicted severe injuries on Driver Irvin. Amputation of a leg was necessary on March 22, but he died next day in Huntingdon hospital. The up express was drawn by 2-6-0 engine No. 2451, and marshalled as follows: two 6-wheeled brake vans, 4 bogie brake vans, 4 bogie passenger coaches, 2 bogie brake vans, and two 4-wheeled fish vans, Nos. 88961 and 151277.

The down express, drawn by 4-4-2 engine No. 4450, comprised nine 8-wheeled bogie coaches, including 3 sleeping cars. Four brake vans carried ambulance equipments. It was a clear but dark night. Lt.-Col. A. H. L. Mount conducted the inquiry.

Between Huntingdon and Hitchin gradients are easy and speed is high in both directions. The only permanent speed restriction, 70 m.p.h., is over the three Offord curves (minimum radius 75 chains). Van No. 151277 mounted the right-hand rail, the mark being 16 ft. long. Markings on the sleepers showed it was gradually deflected from the track alignment for about 2 ft. 6 in., and more or less returned to it, breaking a number of chairs on each rail. It was diverted again towards the down main until the wheels broke more chairs of the right-hand rail, where the division is assumed to have occurred, about 150 yd. from the point of derailment. It rebounded again but, as the right-hand wheels were off the sleeper ends, it came to rest with the left-hand wheels against the right-hand rail. It was thrown back again about 10 yd. by the collision.

It had run derailed 184 yd. and the rear of the train (4-wheeled fish van No. 88961) stopped some 638 yd. beyond, 1¼ miles south of St. Neots, the engine being about 700 yd. in rear of Barford intermediate automatic home signal, at which there is a telephone. The down express came to a stand at St. Neots home signal, 656 yd. from the box.

The permanent way was laid in 1920 with 95-lb. B.S. 45-ft. rails, in 53-lb. common chairs, and 57-lb. joint chairs, secured by two fang-bolts (head on top, former G.N. standard) to 18 sleepers per rail length, with 4-bolt fish-plates, 32 lb. per pair. The track was slag ballasted, and drainage was adequate; formation was on low bank. At the point of derailment (middle of a rail), gauge was ¼ in. slack; for 1½ rail lengths back it was correct, the second joint in rear being also ¼ in. slack. Over the next five or six rail lengths in rear, slackness varied from ¼ in. to $\frac{3}{16}$ in., one or two places being ¼ in.; at the eighth joint back it was $\frac{7}{16}$ in. This condition was typical, the road being generally slack to gauge, ¼ in. to $\frac{3}{16}$ in.; a considerable number of spikes had been driven outside the chairs, to retard further spread. It is impossible to tighten the fangbolts after a few years; corrosion binds the screw and the fang under the sleeper. Corrosion had also taken place at the head of the bolts inside the chairs, due to droppings from fish traffic. The sleepers generally appeared to be in a very fair condition, but slight signs were apparent of chair movement. Line and level, however, were generally good, and recent Hallade records at high speed, with bogie stock, showed that running was excellent. Nevertheless, in view of the foregoing defects and of the heavy and fast nature of the traffic, the road is nearing the end of its life for a main line of this character, and, in accordance with the policy being pursued of taking this type of fang-bolted track out of main line service, arrangements are being made to re-sleeper and re-chair next year.

Van No. 151277 had a wheelbase of 9ft., vacuum brake, and was screw coupled. It had been converted from a refrigerator van in November, 1936, when it was thoroughly overhauled and reduced in tare weight to 9 tons 10 cwt. Its load was about 2 tons of parcels, assumed to be evenly distributed.

The leading wheels were $\frac{1}{32}$ in. to $\frac{1}{16}$ in. slack between the back of the tyres, and correspondingly tight between the flanges on the rails; trailing wheels were $\frac{1}{8}\frac{1}{4}$ in. tight to gauge and therefore slack between flanges. The former showed no wear on the tread, but the latter were about $\frac{3}{32}$ in. hollow.

Longitudinal clearances varied from $\frac{9}{16}$in. to ¾in. instead of the designed $\frac{5}{16}$in. Mr. R. A. Thom, Mechanical Engineer, Southern Area, considered these figures neither excessive nor detrimental to good riding. The 10-ton four wheeled fish van, No. 88,961, immediately ahead also had a 9-ft. wheelbase, and was similarly fitted. It had a timber frame, was built in 1925 and last thoroughly overhauled in November, 1934. Leading wheels were $\frac{1}{8}\frac{1}{2}$in. tight to gauge and considerably worn; the trailing were true to gauge and $\frac{1}{16}$ in. hollow. The body was loose in itself, and on the frame; also in need of repair. This was first noticed during tests mentioned below, and certainly tended to increase oscillation. Col. Mount is inclined to disagree with Mr. Thom in thinking it would have had no detrimental effect on the vehicle in the rear. Some fittings were clearly defective, and repairs admittedly needed, but the examination staff would not have been expected to stop the van from running in this train.

Van No. 151277 had come from Leicester, and was attached in rear at Grantham by an experienced man, Passenger Shunter J. Culpin, who was certain he used the coupling of van No. 88961, placing the other on its hook. The latter was afterwards found hanging down and unscrewed.

Foreman Steptoe gave confirmatory evidence, but although doubt was thrown on that given by Culpin, Col. Mount, on full consideration, is satisfied that the van was properly coupled up. Experience shows that with the derailment of such a vehicle detachment usually occurs if the coupling of the one in front is used.

The up train was booked from Huntingdon to Hitchin at an average speed of 54 m.p.h.; it passed the former place 7 min. late and averaged 62 m.p.h. to St. Neots. Driver E. Kensy said he was not trying to make up time; his speed he estimated at 65 to 70 m.p.h. When running down the Stoke-Peterborough bank ordinary slow passenger trains were constantly operated at such speeds with 4-wheeled freight stock in rear. The down express passed just after the breakaway brake application was felt. Kensy sent fireman Vines to the guard, Gilbert, and then to the telephone at Barford automatic home, protecting the down main meanwhile. Vines and Gilbert confirmed this; the latter caused delay and confusion by reporting at St. Neots that the van was not derailed, actually returning with a light engine to push it along.

Fireman Grimshaw of the down express said derailment was narrowly averted. Woodwork came through the cab window, breaking the whistle joint, thus filling the cab with steam and injuring the driver, as described. He stopped the train at St. Neots down home and communicated with the guard; Irvin was placed on the ground within 5 minutes and received first aid attention from a railwayman. Grimshaw reached the signal box at 2.20 a.m. It is not on the Post Office telephone circuit and Signalman L. A. Mailing had to ring for the callman living near, and when he arrived at 2.35 a.m. sent him to call Foreman Suter, to open the stationmaster's office and telephone for the doctor, and Stationmaster Walden; the latter arrived at 3.20 a.m. and the former reached the injured driver at 3.35 a.m. who reached hospital 55 min. later.

Hallade Oscillation Tests

Tests were carried out for Col. Mount on April 6 between King's Cross and Peterborough with a bogie passenger train having van No. 88961, loaded 2 tons 4 cwt., and refrigerator van No. 139270, similar to No. 151277, carrying 2 tons, in rear, with Hallade instruments and observers in the latter and in the inspection coach ahead of the former. Speed to be observed over different sections had been decided previously and the engine had a Flaman speed recorder. No tendency of the

coupling screw of van 88961 (the coupling concerned in the derailment) to rotate was observed. Oscillation of the rear van increased with speed, reaching the maximum desirable at St. Neots at 60 m.p.h. but was not unduly severe on the Offord curves at this speed. At 68 m.p.h. it was severe enough to necessitate speed being reduced.

It was intended to attain 70 m.p.h. on the up journey, but the loose condition of the body of van No. 88961, noticeable from the inspection saloon, led to speed being limited to 55 m.p.h., and although it was thought on the down journey that this condition increased the oscillation of van No. 139270, this did not appear to be confirmed. Movement of the latter over the site of the derailment seemed as severe at 45 m.p.h. as at higher speeds on the down journey, but at 50 m.p.h. at Tempsford the riding was comparatively good, illustrating the effect of track re-sleepered as recently as 1935 and 1936. The tests led Col. Mount to conclude that:—

(1) The condition of van No. 88961 probably affected the oscillation of the one in rear.
(2) Oscillation increased with speed and was noticeably severe beyond 60 m.p.h.
(Graphs of various comparative Hallade records are printed in the report.)

Chief Inspecting Officer's Conclusions

Having regard to the evidence, other information, and calculations, speed at the time of derailment must have been 70 m.p.h. Track at site was fit for some of the fastest running with bogie vehicles but was slightly wide to gauge and could thus contribute to any tendency to oscillation in 4-wheeled stock. Bearing the tests in mind, the condition of van No. 88961 undoubtedly induced sufficiently dangerous oscillation of No. 151277 to bring about its derailment. The condition of the latter was normal. There was no evidence that eccentric weight distribution had anything to do with the accident.

Remarks and Recommendations

Col. Mount thinks it desirable to draw the attention of the companies to this case. Derailments of this kind need serious consideration, in view of increasing speeds. A disaster might well have occurred had this van been further foul of the express. In recent examples of similar derailments, at Wincobank, Wolvercot, Wath, and Castlethorpe, there appears little doubt that oscillation at comparatively high speed was the producing factor.

Prima facie, it would appear that safeguarding action should take the form of increased wheelbase, and of specified minimum loading with assurance of equal distribution. But the size of turntables, and the layout of goods depots, in this country render it impracticable to operate, in general service, vehicles with wheelbase longer than 10-ft. In fact, large numbers of such fitted freight stock are under construction, the shorter wheelbase of 9-ft. having recently been superseded as the standard, in order to afford greater stability at speed.

To place a minimum limit on loading would also be impracticable, and serious issues regarding competition with road transport are involved in connection with goods and perishable traffic, which is expeditiously handled by this means on passenger trains. Moreover, the practice is of many years' standing, and while such operation is prohibited (except with special authority) on important expresses, prohibition in respect of the train in question, and of the corresponding train from Leeds, would hardly be a practical policy. To ensure, therefore, a reasonable factor of safety, the only solution, short of prohibition, is strictly to limit maximum speed of all trains concerned. Moreover, apart from safety, there must be the serious economic aspect of the damaging effect on track material of the operation of fast freight traffic with rolling stock of the type in question. There is also the important practical consideration that track and rolling stock cannot permanently retain perfection in running conditions.

In view of the general acceleration of services which is taking place, Col. Mount suggests that the companies be asked to give further consideration to the whole question; comprehensive tests might well be carried out to ascertain more accurately the comparative effect of speed on short wheelbase four-wheeled vehicles under various conditions of operation and load, and particularly in respect of the incidence and amount of side pressure between flange and rail.

Pending such consideration, he recommends that, without further delay, operation of all short wheelbase (under, say 15-ft.) freight stock should be rigidly restricted to a maximum of 60 m.p.h. at any point on the journey. The existing schedules of the two trains referred to have stood for some years, but they should now be critically examined with a view to such deceleration; the Chief Mechanical and Civil Engineers, and the Superintendent (Western Section) agree that the appropriate solution must, in the circumstances, be speed limitation, strict compliance with which should be regarded as of primary importance.

The Regulations require revision, and operation of short wheelbase freight stock on passenger trains should be further restricted, to meet only the most essential commercial needs. Consideration should be given to the question of adding a four-wheeled brake van of long wheelbase when more than one four-wheeled vehicle of short wheelbase is attached in rear. Placing such stock between engine and train, and especially between bogie vehicles, appears very undesirable, but the regulations of some of the companies already cover this.

It is clear that the guard of the up express failed to rise to the occasion. Neither the guard nor the sleeping car attendant of the down express appear to have exercised the initiative expected of men in their position. No use was made of any of the ambulance boxes, and, though blankets from the sleeping car were made available, a mattress was not utilised until the doctor arrived. Fireman Grimshaw lost no time, but the chain of communication did not permit either the doctor or stationmaster to be called for an hour, with the train, with this serious casualty, standing at the home signal. Unless a stationmaster's Post Office telephone can be connected to the signal box at night, signalmen should be instructed to advise the District Control Office (where such an organisation is in force) when medical assistance is required in the case of accident; it should then be the duty of the controller immediately to use the Post Office telephone system to the nearest doctor and/or hospital. Had such a course been adopted the doctor would presumably have been called at least half-an-hour earlier. This is an important aspect of emergency procedure, and it is understood that consideration on some such lines is being given to the matter.

Questions in Parliament

Wood and Steel Coaches

Mr. Edward Williams (Ogmore—Lab.) on July 7 asked the Minister of Transport, whether, arising out of the Swanley and Battersea accidents, he would institute a thorough inquiry into the merits of wood and steel coaches.

Dr. Leslie Burgin (Minister of Transport): Coaches of modern design embody steel to the extent of 75 to 80 per cent. of their weight. I do not think any useful purpose would be served by instituting a special inquiry. The question is constantly under review.

Travelling Accommodation

Mr. H. Day (Southwark, Central—Lab.) on July 7 asked the Minister of Transport, whether he could state the result of his communications with the London Passenger Transport Board on the question of providing more frequent trains of greater capacity upon the routes where congestion was most acute during the peak hours; and whether any arrangements were being made to increase the travelling accommodation on the lines serving the Elephant & Castle and South London districts.

Dr. Burgin: With regard to the first part of the question, I stated the result of my communications in the reply which I gave to the hon. member on June 23. As regards the second part, I am informed by the board that, on the Bakerloo Line, work is about to commence on the lengthening of the station platforms to enable longer trains to be run; and, in the case of the Morden Line, new rolling stock is now under construction which will increase the accommodation of the trains on that line.

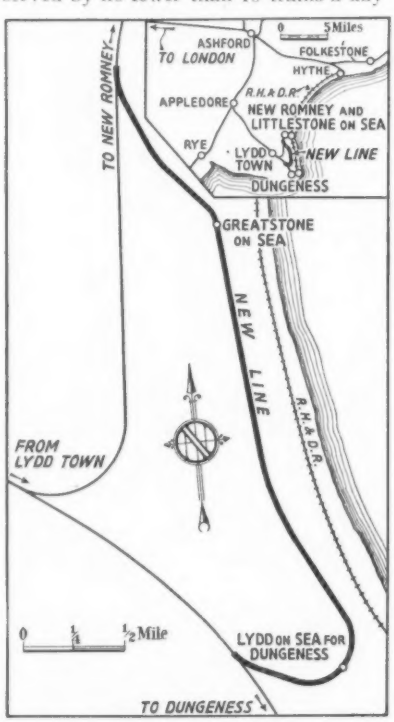
NOTES AND NEWS

The C.P.R. in London.—The office of the Deputy Secretary and Registrar of the Canadian Pacific Railway Company will be at 8, Waterloo Place, S.W.1, from July 12.

Progress of Railway Bills.—The Royal Assent was given on July 1 to the London Midland & Scottish Railway Act, 1937, and to the London & North Eastern Railway Act, 1937. The third reading in the House of Lords of the London Passenger Transport Bill (amended) is to be taken on July 14, when amendments will be moved.

World Power Conference.—It has been decided to hold a sectional meeting of the World Power Conference in Vienna at the end of August and beginning of September next year. The topics to be discussed will centre on "the energy requirements of agriculture, small-scale industry, the household, public lighting, and electric railways." The subjects will be considered as much in their economic as in their purely technical aspects. The Fourth Plenary Meeting of the World Power Conference is to be held in Tokyo in 1942.

New Kent Coast Line.—With the introduction of the summer train service, the new Southern Railway line between Lydd and New Romney, on the Kent coast just south of Hythe, was brought into use. Two additional stations, Lydd-on-Sea (for Dungeness) and Greatstone-on-Sea, have been built, and the many holiday camps which are a feature of this part of the coast will now be served by no fewer than 10 trains a day from London (Charing Cross, Cannon Street, London Bridge, and Victoria), via Ashford. Lydd station has been renamed Lydd Town, and passenger services on the Dungeness branch have been withdrawn.



Sketch map of the new Southern Railway Kent Coast line

Opening of Bude Branch on Sundays.—The Southern Railway branch line from Halwill to Bude, which has hitherto been closed on Sundays, was opened on July 4 and will be open on Sundays, August 1 to September 12. Connections will be made at Okehampton with the main-line services.

Canadian Pacific Steamer Service.—The Canadian Pacific Railway has applied to the Interstate Commerce Commission of the U.S.A. for permission to run a steamer service to Milwaukee and Chicago. This is a result of the decision of the Great Lakes Transit Corporation to suspend the operation of its vessels on Lake Michigan.

Railwaymen in Spain.—Railway servants in Spain are no longer to enjoy exemption from military service. The *Official Gazette* contains an order of the Defence Ministry in Valencia repealing the exemption order, and railwaymen will now be called upon to join up, except in special circumstances or when their railway services are judged to be indispensable.

Southern Railway Electrification.—On Sunday last, July 4, the full electric service on the newly-electrified Southern Railway line to Portsmouth, via the Direct line, was brought into use. On July 4, also, the new electric services were introduced between Waterloo, Aldershot, Farnham, and Alton. Some public electric trains have been worked during the past few months, pending the formal change-over. These important electrifications were fully described in a supplement to THE RAILWAY GAZETTE of June 25.

French Railway Fares for Exhibition Visitors.—The French railways announce that, whatever the decision which may be taken regarding the proposals for a slight increase in their tariffs, which have been submitted to the Ministère des Travaux Publics, it will not apply to tickets at 50 per cent. reduction booked by holders of the *carte de legitimation* issued in connection with the Paris International Exhibition of 1937. The fares for these tickets will continue to be calculated according to the basic kilometric rates at present in force.

Stanmore Branch Improvements, L.M.S.R.—With the completion of the new station at Belmont, the L.M.S.R. introduced augmented services on its Stanmore branch between Harrow & Wealdstone and Stanmore (Middlesex) on Monday last, July 5. Following the provision of a crossing loop at Belmont (the intermediate station) and alterations in the signalling arrangements, two trains instead of one are now able to work this single-track branch. The new Belmont station is of the island platform type, with centrally-heated waiting rooms. The booking office is at road level near Kenton Lane bridge.

Extra Boat for Isle of Wight Service.—The paddle steamer *Ryde*, which the Southern Railway has had constructed for the Portsmouth–Ryde route, entered service on July 1. This steamer has accommodation for 1,050 passengers, and brings the total number of paddle boats in use on this route up to eight.

Walker Diesel Railcars.—The business of W. D. Colin York & Co. has been acquired by A. C. Wickman Limited, of Coventry. Major W. D. Colin York, O.B.E., has been appointed Export Manager with offices at 10, Princes Street, London, S.W.1, and will continue to look after the railcar interests of Walker Bros. (Wigan) Limited, and Cotal Chadburn Co. Ltd., as formerly.

Killamarsh Junction, L.N.E.R. Accident Report.—By an unfortunate misprint in our editorial note on page 3 last week a comment we made on Lt.-Colonel Woodhouse's report on Killamarsh Junction accident of January 26 read that there was "no arm moving with the block." The word "moving" should, of course, have read "proving." A similar misprint occurred three lines lower.

Wood in Modern Railway Coaches.—After a protest of the Timber Development Association against the commentary of Paramount News in the news reel film dealing with the railway accident at Swanley Junction, the proprietors of Paramount News, on Friday last offered the association an opportunity of demonstrating the function of timber in the construction of railway coaches of the latest type. We learn that the offer is to be accepted.

Gift to York Railway Museum.—The York Railway Museum has received from Mrs. McDougall the gift of thirty portfolios of locomotive photographs and a number of loose prints, the collection of the late Mr. Joseph McDougall of Leeds. In all, there are about 10,000 representations of past and present engines and trains on the railways of the world, including modern high-speed trains such as the Silver Jubilee and the Flying Hamburger.

Memorial to Transandine Engineers.—On May 7, a monument, bearing a suitable inscription, was unveiled at km. 57, near Juncal, on the Chilean Transandine Railway, to the memory of Mr. Peter Jardine, a British engineer, and several workmen, in the employment of the railway, who lost their lives in July last year, through being overtaken by an avalanche near that spot, while engaged in clearing the line after a heavy snowfall. The incident was recorded in THE RAILWAY GAZETTE of September 11, 1936. Amongst those present at the ceremony were Señor Juan Lagarrigue, Director-General of the Chilean State Railways, and several other high officials representing the Chilean and Argentine railways.

British and Irish Traffic Returns

GREAT BRITAIN	Totals for 26th Week			Totals to Date		
	1937	1936	Inc. or Dec.	1937	1936	Inc. or Dec.
L.M.S.R. (6,871½ mls.)	£	£	£	£	£	£
Passenger-train traffic...	678,000	649,000	+ 29,000	12,139,000	11,664,000	+ 475,000
Merchandise, &c. ...	503,000	483,000	+ 20,000	12,737,000	12,373,000	+ 364,000
Coal and coke ...	220,000	204,000	+ 16,000	6,873,000	6,383,000	+ 490,000
Goods-train traffic ...	723,000	687,000	+ 36,000	19,610,000	18,756,000	+ 854,000
Total receipts	1,401,000	1,336,000	+ 65,000	31,749,000	30,420,000	+1,329,000
L.N.E.R. (6,315 mls.)						
Passenger-train traffic...	430,000	395,000	+ 35,000	7,920,000	7,568,000	+ 352,000
Merchandise, &c. ...	360,000	332,000	+ 38,000	8,820,000	8,414,000	+ 406,000
Coal and coke ...	237,000	198,000	+ 39,000	6,534,000	6,105,000	+ 429,000
Goods-train traffic ...	597,000	520,000	+ 77,000	15,354,000	14,519,000	+ 835,000
Total receipts	1,027,000	915,000	+ 112,000	23,274,000	22,087,000	+1,187,000
G.W.R. (3,738¼ mls.)						
Passenger-train traffic...	274,000	278,000	— 4,000	5,044,000	4,862,000	+ 182,000
Merchandise, &c. ...	200,000	196,000	+ 4,000	5,119,000	4,932,000	+ 187,000
Coal and coke ...	107,000	87,000	+ 20,000	2,922,000	2,621,000	+ 301,000
Goods-train traffic ...	307,000	283,000	+ 24,000	8,041,000	7,553,000	+ 488,000
Total receipts	581,000	561,000	+ 20,000	13,085,000	12,415,000	+ 670,000
S.R. (2,153 mls.)						
Passenger-train traffic...	388,000	372,000	+ 16,000	7,764,000	7,347,000	+ 417,000
Merchandise, &c. ...	65,000	61,500	+ 3,500	1,572,500	1,625,000	— 52,500
Coal and coke ...	26,000	25,500	+ 500	806,500	812,000	— 5,500
Goods-train traffic ...	91,000	87,000	+ 4,000	2,379,000	2,437,000	— 58,000
Total receipts	479,000	459,000	+ 20,000	10,143,000	9,784,000	+ 359,000
Liverpool Overhead ... (6½ mls.)	1,406	1,334	+ 72	32,703	29,952	+ 2,751
Mersey (4½ mls.) ...	4,222	4,154	+ 68	109,018	105,119	+ 3,899
*London Passenger Transport Board ...	582,100	576,100	+ 6,000	582,100	576,100	+ 6,000
IRELAND.						
†Belfast & C.D. pass. (80 mls.)	3,637	4,496	— 859	55,630	58,262	— 2,632
,, ,, goods	572	608	— 36	13,152	14,699	— 1,547
,, ,, total	4,209	5,104	— 895	68,782	72,961	— 4,179
Great Northern pass. (543 mls.)	14,150	15,400	— 1,250	239,550	239,250	+ 300
,, ,, goods	10,350	9,000	+ 1,350	245,700	259,900	— 14,200
,, ,, total	24,500	24,400	+ 100	485,250	499,150	— 13,900
Great Southern pass. (2,075 mls.)	46,632	47,958	— 1,326	811,165	820,997	— 9,832
,, ,, goods	38,963	37,500	+ 1,463	1,073,143	1,083,281	— 10,138
,, ,, total	85,595	85,458	+ 137	1,884,308	1,904,278	— 19,970

* 1st week (before pooling). † 27th week.

RAILWAY AND OTHER REPORTS

Midland Bank Limited.—The directors announce an interim dividend for the half-year ended June 30 last at the rate of 16 per cent. per annum less income tax, payable on July 15 next. The same rate of dividend was declared a year ago.

Callender's Cable & Construction Co. Ltd.—Gross profits for the year 1936 amounted to £833,640, against £647,515 for 1935, and the net profit, after providing for repairs and maintenance, general expenses, pension fund, etc., was £581,866 compared with £405,950. From the net profit of £581,866 is deducted depreciation, £70,000; tax reserve, £30,000; debenture interest, £13,500; and preference dividends, £56,000 It is proposed to pay an ordinary dividend of 15 per cent. for the year, together with a special cash bonus of 5 per cent. (absorbing £224,783), to place £160,000 to general reserve, and to carry forward £397,817, compared with £390,234. During the year large contracts were placed with the company, largely for heavy underground mains. The general home cable business expanded, and the export trade to India increased. This was also the case in Australia, New Zealand, and South Africa. There was satisfactory business in South America and elsewhere in the western hemisphere.

Guest, Keen and Nettlefolds Limited.—After charging debenture interest (£64,662), and providing for redemption of £37,135 debenture stock, the profits of the year ended March 31 are £1,048,727. Provision is made of £75,000 for wear and tear and of £75,000 for obsolescence, and a sum of £150,000 is set aside as a provision for writing off under works reorganisation schemes. Payment on July 10 is recommended of a final dividend, free of tax, of 3½ per cent. (against 2½ per cent.), on the ordinary stock, making 6 per cent. tax free for the year, against 5 per cent., tax free.

British and Irish Railway Stocks and Shares

Stocks	Highest 1936	Lowest 1936	Prices July 7, 1937	Rise/Fall
G.W.R.				
Cons. Ord. ...	64¼	45½	64	+1½
5% Con. Prefce. ...	126½	116¾	117½	—
5% Red.Pref.(1950)	113	108½	111½	—
4% Deb.	119½	110½	105½	—
4½% Deb.... ...	121	114	111	—
4½% Deb.... ...	129	121	117½	—
5% Deb.	141	134	128½	—
2½% Deb.... ...	79⅛	74	69½	—
5% Rt. Charge ...	136½	130	127½	—
5% Cons. Guar. ...	135¼	127¾	126	—
L.M.S.R.				
Ord.	35⅝	17	33¾	+¼
4% Prefce. (1923)	83	52½	77½	+½
4% Prefce. ...	92¾	81	87	—
5% Red.Pref.(1955)	109¼	103¼	104	—
4% Deb.	111¾	105 9/16	102	—
5% Red.Deb.(1952)	119⅝	115½	112½	—
4% Guar. ...	106¾	101⅝	99½	+½
L.N.E.R.				
5% Pref. Ord. ...	14	9	10¼	+¼
Def. Ord.	7¼	4¾	5⅛	+⅛
4% First Prefce.	79¼	55¼	73	+½
4% Second Prefce.	31⅞	18¼	27	+1
5% Red.Pref.(1955)	100½	77¾	96	—
4% First Guar. ...	104½	98¾	98½	—
4% Second Guar.	99	90	91½	—
3% Deb.	85¾	79	75	−1½
4% Deb.	109¾	104½	100½	—
5% Red.Deb.(1947)	116¼	110½	109½	—
4½% Sinking Fund Red. Deb.	111½	107½	107	—
SOUTHERN				
Pref. Ord.... ...	98¾	82½	92	—
Def. Ord.	27⅝	20⅛	22¼	+¼
5% Pref.	120¾	118½	116½	—
5% Red.Pref.(1964)	119¾	115¼	115½	—
5% Guar. Prefce.	136	129½	127	—
5% Red.Guar.Pref. (1957)	120	115¾	115½	—
4% Deb.	117 5/16	109½	103½	—
5% Deb.	140	134	126½	—
4% Red. Deb. 1962–67	116½	110	106½	−2
BELFAST & C.D.				
Ord.	9	4½	4	—
FORTH BRIDGE				
4% Deb.	107	105	100½	—
4% Guar. ...	107 5/16	104	100½	—
G. NORTHERN (IRELAND)				
Ord.	19½	9¾	7	−¾
G. SOUTHERN (IRELAND)				
Ord.	63	41	34½	—
Prefce.	65	46	46	—
Guar.	97¼	81	72¼	−¼
Deb.	99¾	83¼	89	—
L.P.T.B.				
4½% "A" ...	127¾	121	116½	—
5% "A"... ...	138¼	133½	125½	−1
4½% "T.F.A." ...	111½	108⅛	105	−1
5% "B"... ...	131¾	123¾	117½	—
"C"	112½	93	78	−1
MERSEY				
Ord.	40¾	23	27·2	—
4% Perp. Deb. ...	103	98	99	—
3% Perp. Deb. ...	78	74⅝	75½	—
3% Perp. Prefce.	68⅞	63¼	65½	—

LEGAL AND OFFICIAL NOTICES

In the Court of the Railway Rates Tribunal.

Road and Rail Traffic Act, 1933.

Agreed Charges.

NOTICE IS HEREBY GIVEN that Applications for the approval of Agreed Charges under the provisions of Section 37 of the Road and Rail Traffic Act, 1933, short particulars of which are set out in the Schedule hereto, have been lodged with the Railway Rates Tribunal.

The Procedure to be followed in regard to the inspection of the said Applications and the filing of Notices of Objections is that published in the "London Gazette" of 28th July, 1936.

Printed copies of the Procedure can be obtained from the Railway Rates Tribunal, Bush House, Aldwych, London, W.C.2.

Notices of Objection to any of the said Applications must be filed on or before the 30th July, 1937.

A copy of each Application can be obtained from Mr. G. Cole Deacon, Secretary, Rates and Charges Committee, 35, Parliament Street, Westminster, London, S.W.1, price 1s. post free.

T. J. D ATKINSON,
Registrar

6th July, 1937.

Number of Application	Name of Trader and General Description of Traffic
1937—No. 352	INTERNATIONAL HARVESTER COMPANY OF GREAT BRITAIN, LTD., Harvester House, 259, City Road, London, E.C.1; Agricultural Machinery, Motor Truck Parks, etc.
1937—No. 354	JOHN DICKINSON & CO. LTD., Apsley Mills, Hemel Hempsted, Herts; Paper, Cardboard, Stationery, etc.
1937—No. 355	SAXONE SHOE CO. LTD., Kilmarnock; Boots and Shoes, etc.
1937—No. 356	NEWTON CHAMBERS & CO. LTD., Thorncliffe, near Sheffield; Disinfectants, Shaving Cream, Spraying Machines, etc.
1937—No. 361	ABSOLOM CROCKER & CO. LTD., 1, Crutched Friars, London, E.C.3; Tea, Coffee, Jellies, etc.
1937—No. 362	BAIRD, WOLTON & MAY LIMITED, 45, Borough High Street, London, S.E.1; Canned Goods, Jam, etc.
1937—No. 363	W. H. COTTON & SONS LTD., Earl Shilton, Leicester; Boots and Shoes.
1937—No. 364	J. & H. GLASMAN, "Betal" Works, Plaistow Road, London, E.15; Toys, etc.
1937—No. 365	KELLETT WOODMAN & CO. LTD., 44, Union Street, Bradford, Yorks; Textiles.
1937—No. 366	SANTON LIMITED, Somerton Works, Newport (Mon.); Electrical Appliances, Earthenware, Hardware, etc.
1937—No. 367	THE TILLEY LAMP COMPANY, Brent Works, Hendon, N.W.4; Paraffin Vapour Lamps, Lanterns, Radiators, Glassware, etc.
1937—No. 368	WIGGLESWORTH LIMITED, Westhoughton, Bolton, Lancs; Drugs and Druggists' Sundries.
1937—No. 369	THOMAS WITTER & CO. LTD., 86, York Road, King's Cross, London, N.1; Printed Paper Linoleum and Cork Linoleum other than Balatum Squares.
1937—No. 370	ACKLAND & PRATTEN LIMITED, Portland Works, Bristol, 2; Paper, Stationery, etc.
1937—No. 371	JAMES AIKMAN & SONS, 45–53, Jeffrey Street, Edinburgh, 1; Boots and Shoes.
1937—No. 372	T. W. BEACH & SONS LTD., Evesham; Preserves, Fruit Squashes.
1937—No. 373	BRAMFORD'S CHRISTMAS CLUB LIMITED, Bramford House, Kingswood, Bristol; Confectionery, Toys, Tobacco, Household Requisites, etc.
1937—No. 374	THE BRITISH G.W.Z. BATTERY CO. LTD., Falmouth Road, Trading Estate, Slough; Dry Cell Batteries, Accumulators, etc. *Applicable also to traffic consigned by two Associated or Subsidiary Companies.*
1937—No. 375	THE BRITISH G.W.Z. BATTERY CO. LTD., Falmouth Road, Trading Estate, Slough; Empties returned to the Trader. *Applicable also to traffic consigned by two Associated or Subsidiary Companies.*
1937—No. 376	JAMES CARTER & CO. (CARTERS TESTED SEEDS LTD.), Raynes Park, London, S.W.20; Fertilizers, Seeds.
1937—No. 377	THE CHISWICK PRODUCTS LIMITED, Burlington Lane, Chiswick, London, W.4; Varnishes, Paints, Stains, Polishing Materials, Tools, Machinery, Tinplates, Furniture, etc. *Applicable also to traffic consigned by two Associated or Subsidiary Companies.*
1937—No. 378	COLEMAN & CO. LTD., Wincarnis Works, Norwich; "Wincarnis," etc.
1937—No. 379	CRANBUX LIMITED, 103, Westwick Street, Norwich; "Odol," etc.
1937—No. 380	HARRODS LIMITED, Knightsbridge, S.W.1; Furniture and General Stores, etc.
1937—No. 381	C. HERENDEEN & CO. LTD., Anson Place, Liverpool, 3; Sausage Meal, Pepper and Spices.
1937—No. 382	S. C. JOHNSON & SON LTD., West Drayton, Middlesex; Wax Polish, Wood Stains, Varnish, etc.
1937—No. 383	JUDGE BRAND CO. LTD., 24, Eldon Square, Newcastle-on-Tyne, 1; Enamels, Varnish, etc.
1937—No. 384	LEA & PERRINS LIMITED, Midland Road, Worcester; Sauces, Salad Cream, etc.
1937—No. 385	JOHN LOVEYS & CO. LTD., 64–69, Cow Cross Street, London, E.C.1; Boots and Shoes, Clothing, etc.
1937—No. 386	WILLIAM MACDONALD & SONS, Cardonald, Glasgow, S.W.2; Biscuits.
1937—No. 387	MARR DOWNIE & CO. LTD., 48, Avenue Street, Bridgeton, Glasgow; Stationery, etc.
1937—No. 388	MCCLURE, YOUNG & CO. LTD., 90, Standard Road, Park Royal, London, N.W.10; Chemicals, Disinfectants, etc.
1937—No. 389	HARRY RUDGE, Islington Works, Halesowen: Ironmongery, etc.
1937—No. 390	RUDKIN LAUNDON & CO. LTD., 346, St. Saviours Road, Leicester; Hosiery and Knitted Wear.
1937—No. 391	SICHEL ADHESIVES LIMITED, Richmond, Surrey; Gums, etc.
1937—No. 392	WM. TEACHER & SONS LTD., 14, St. Enoch Square, Glasgow, C.1; Wines and Spirits, etc., ex London.
1937—No. 393	WM. TEACHER & SONS LTD., 14, St. Enoch Square, Glasgow, C.1; Empties returned to London.
1937—No. 394	WM. TEACHER & SONS LTD., 14, St. Enoch Square, Glasgow, C.1; Wines and Spirits, etc., ex Glasgow.
1937—No. 395	WM. TEACHER & SONS LIMITED, 14, St. Enoch Square, Glasgow, C.1; Empties returned to Glasgow.
1937—No. 396	LITTLEWOODS MAIL ORDER STORES LIMITED, Liverpool; Clothing, Drapery and General Stores Wares.

Number of Application	Name of Trade and General Description of Traffic
1937—No. 397	THE TRENEAR DAIRY CO. LTD., Wendron, Helston, Cornwall; Butter and Cream.
1937—No. 398	TURNBULL & STOCKDALE LIMITED, Rosebank Print Works, Ramsbottom; Textiles.
1937—No. 399	BELAM & BRINLEY, Collins Road, Totnes; Rabbits (dead).
1937—No. 400	S. COLLIER & CO. LTD., Trowbridge; Cloth.
1937—No. 401	MARR, DOWNIE & CO. LTD., 48, Avenue Street, Bridgeton, Glasgow; Stationery, etc.
1937—No. 402	JOSEPH MAY & SONS (LEEDS) LTD., Maenson House, Whitehall Road, Leeds, 12; Clothing.
1937—No. 403	McGROUTHER LIMITED, Cornton Road, Stirling; Bacon, Margarine, Meat and Sausages.
1937—No. 404	RICHMOND SAUSAGE CO. LTD., 7–11, Linacre Road, Litherland, Liverpool, 21; Sausages.
1937—No. 405	TONKIN BROS., Church Street, Kingsbridge, Devon; Rabbits (dead).
1937—No. 406	GEORGE WEBB & SONS, Mentone Works, Brockton Street, Northampton; Boots and Shoes.
1937—No. 407	STANDARD SOAP CO. LTD., Ashby-de-la-Zouch; Soap, etc. *Applicable also to traffic consigned by one Associated or Subsidiary Company.*
1937—No. 408	COMRADE CYCLE COMPANY, The Leys, Darlaston; Bicycles, Tricycles, Wheelbarrows, etc.
1937—No. 409	THE DISTRIBUTERS AND TRANSPORTERS LIMITED (MESSRS. UNILEVER'S DISTRIBUTING ORGANISATION), Unilever House, Blackfriars, London, E.C.4; Soap, Wood Preservative, etc., ex Renfrew. *Applicable to traffic consigned by five Associated or Subsidiary Companies.*
1937—No. 410	THE DISTRIBUTERS AND TRANSPORTERS LIMITED (MESSRS. UNILEVERS' DISTRIBUTING ORGANISATION), Unilever House, Blackfriars, London, E.C.4; Butter and Margarine, ex Mauchline. *Applicable to traffic consigned by one Associated or Subsidiary Company.*
1937—No. 411	THE DISTRIBUTERS AND TRANSPORTERS LIMITED (MESSRS. UNILEVER'S DISTRIBUTING ORGANISATION), Unilever House, Blackfriars, London, E.C.4; Soap, Candles, Fats, etc., ex Aberdeen. *Applicable to traffic consigned by two Associated or Subsidiary Companies.*
1937—No. 412	LENNARDS LIMITED, Queens Road, Bristol, 8; Boots and Shoes, Shop Fittings, Stationery, etc.
1937—No. 413	THE CALOR-GAS (DISTRIBUTING) CO. LTD., 17–18, Margaret Street, London, W.1; Butane Gas.
1937—No. 414	IMPERIAL SERVICE WINE ASSOCIATION LIMITED, 30, Mark Lane, London, E.C.3; Wine and Spirits.
1937—No. 415	LAWLEYS LIMITED, 36, Golden Square, London, W.1; China, Earthenware, Glassware, Hardware, etc.
1937—No. 416	LAWLEYS LIMITED, 36, Golden Square, London, W.1; Earthenware.
1937—No. 417	GEORGE WEBB & SONS, Mentone Works, Brockton Street, Northampton; Boots and Shoes.
1937—No. 418	LEWIS & HYLAND, New Rents, Ashford, Kent; Boots and Shoes, Clothing, Drapery, Furniture, etc. *Applicable also to traffic consigned by two Associated or Subsidiary Companies.*
1937—No. 419	G. ROBINSON & SONS (CORNWALL) LTD., Camelford, Cornwall; Rabbits (dead).
1937—No. 420	M. SALM & SONS LTD., MODELLUS HOUSE, 79, Wells Street, London, W.1; Ladies' Wear.
1937—No. 421	UNITED DAIRIES LIMITED, 31, St. Petersburgh Place, London, W.C.2; Butter, Cheese, Cream, Eggs, etc. *Applicable also to traffic consigned by seven Association or Subsidiary Companies.*
1937—No. 422	T. G. TICKLER LIMITED, Grimsby; Bottled Pickles, Bottled Fruit, Cordials, James, British Wines, Honey and Cider. *Applicable also to traffic consigned by one Associated or Subsidiary Company.*
1937—No. 423	T. G. TICKLER LIMITED, Grimsby; Empties returned to the Trader.
1937—No. 424	LOTUS LIMITED, Stafford; Boots and Shoes, ex Northampton.
1937—No. 425	LOTUS LIMITED, Stafford; Boots and Shoes, ex Stafford.
1937—No. 426	JOHN LOVEYS & CO. LTD., 64–69, Cowcross Street, London, E.C.1; Boots, Shoes, Clothing and Hosiery.
1937—No. 427	MOORE & SONS, Looe, Cornwall; Rabbits (dead).
1937—No. 428	THE GREAT UNIVERSAL STORES LIMITED, Devonshire Street, Ardwick, Manchester; Furniture, General Stores Wares, etc. *Applicable also to traffic consigned by three Associated or Subsidiary Companies.*
1937—No. 429	THE MANCHESTER MUTUAL TRADING ASSOCIATION LIMITED, Granby Row, Manchester, 1; General Household Requisites.
1937—No. 430	OXENDALE & CO. LTD., Granby Row, Manchester, 1; General Household Requisites.
1937—No. 431	ROSE, MORRIS & CO. LTD., 57, City Road, London, E.C.1; Musical Instruments, Toys, Hardware, etc.
1937—No. 432	ROBERT LAWSON & SONS (DYCE) LTD., Dyce, Aberdeenshire, Cooked Meats, Sausages, etc.

Legal and Official Notices—(*continued*)

The Madras & Southern Mahratta Railway Company Limited.

THE Directors of the above-named Company invite applications for the post of ASSISTANT TRANSPORTATION SUPERINTENDENT (POWLR) for service in India in October, 1937.

The qualifications required are as follows:—

Age—24 years.

Applicant to be of European Domicile with at least two years practical experience, including periods in a Locomotive Running Shed and on the footplate. In addition, experience of diesel engines would be an advantage.

Commencing salary—Rs. 350 per mensem, in scale Rs. 350-25-450 and Rs. 500 per mensem in the 7th year of service. In addition Overseas Pay as follows:—

1st to 4th year of service Rs. 150 per mensem.
5th to 7th year of service £15 per mensem.
8th to 11th year of service £25 per mensem.
12th year onwards £30 per mensem.

Leave—According to Rules.

Terms—Subject to a strict medical examination by the Company's Consulting Physician, a three years' agreement in the first instance, a first class free passage to India, and home again on satisfactory termination of agreement, which is extensible by mutual consent. Employees are required to subscribe one month's pay yearly to the Company's Provident Fund, and to those of over five years' service, a bonus equal to their contribution is credited, both bonus and contribution accumulating at compound interest until retirement.

Applications (by letter only) giving full particulars of general and technical education and practical experience in chronological order, stating age, whether married or single, together with copies only of testimonials should be forwarded as soon as possible and in any case not later than July 31, 1937, addressed to:—

The Secretary,
Madras & Southern Mahratta Railway Co. Ltd.,
25, Buckingham Palace Road,
Westminster, S.W.1.

July 7, 1937.

Bombay, Baroda & Central India Railway Company

NOTICE IS HEREBY GIVEN that the One Hundred and Fiftieth General Meeting of the Bombay, Baroda & Central India Railway Company will be held at Southern House, Cannon Street, London, E.C.4, on Wednesday, the 21st July, at 1 o'clock precisely.

(1) To receive the Directors' Report and Accounts.
(2) To declare a dividend.
(3) To transact the general business of the Company.

Warrants for the guaranteed interest and dividend will be forwarded on the 21st day of July to Stockholders registered in the Company's books on the 26th day of June, 1937.

By Order,
N. LINCOLN,
Secretary.

N.B.—A copy of the Directors' Report and Accounts can be obtained by any Stockholder on application to the Secretary.

Offices:
The White Mansion,
91, Petty France,
Westminster, S.W.1.
5th July, 1937.

South Indian Railway Company, Limited

THE Directors are prepared to receive Tenders for the supply of:—

30 Tons TIN INGOTS.

Specifications and Forms of Tender will be available at the Company's Offices, 91, Petty France, Westminster, S.W.1.

Tenders addressed to the Chairman and Directors of the South Indian Railway Company Limited, marked "Tender for Tin Ingots," with the name of the firm tendering, must be left with the undersigned not later than 9.30 a.m., Friday, the 16th July, 1937.

The Directors do not bind themselves to accept the lowest or any Tender.

A charge, which will not be returned, will be made of £1 for each copy of the Specification.

E. A. S. BELL,
Managing Director.

91, Petty France,
Westminster, S.W.1.
7th July, 1937.

WANTED.—Mechanical Engineer for European Engineering Works in India, about 30 years of age and with B.Sc. degree. Applicants must have special knowledge of heavy machine shop production methods coupled with business, office routine and drawing office experience. Experience in the production of railway points and crossings an advantage. Good salary, with provident fund, free passages and generous leave. Apply, by letter, with copies of testimonials, stating age and whether married or single, to: "SWITCH," c/o ABBOTTS, 32, Eastcheap, London, E.C.3.

CONTRACTS AND TENDERS

W. Gilmour Smith & Co. Ltd. has supplied Railite train-lighting belting to both the L.M.S. and L.N.E. Railways for use on the new Coronation Scot and The Coronation Express trains respectively. Illustrations and descriptions of these trains appeared, in the case of the L.M.S.R. stock, in our issue of May 28, and in the case of the L.N.E.R. train, in our issue of July 2.

York Station Resignalling, L.N.E.R.

The Westinghouse Brake & Signal Co. Ltd. has received a contract from the L.N.E.R. for resignalling York station. The installation will be of the relay interlocking type, operating approximately 900 routes, and will cover the whole of York station, extending from Chaloners Whin junction to Poppleton junction. The contract includes the supply and fixing of a large number of multi-unit colour-light and position light subsidiary signals, and approximately 300 point layouts, for which, as in the case of Leeds New station, the railway company has selected electro-pneumatic operation.

The Monkbridge Iron & Steel Co. Ltd. has received an order from the Assam-Bengal Railway, to the inspection of Messrs. Rendel, Palmer & Tritton, for Sorbitic steel locomotive tyres.

Skoda (India) Limited has received orders from the Indian Stores Department for 75 locomotive driving wheel tyres at a total price of Rs. 15,019, delivery free G.I.P. Stores Depot, Bombay.

Whitelegg & Rogers Limited has received orders for Ajax axlebox grease lubricators for 11 4-6-2 locomotives under construction by the North British Locomotive Co. Ltd. for the Federated Malay States Railways, and for use with new axleboxes to be supplied by Kitson & Co. Ltd. for fitting to metre-gauge 4-6-2 and 2-8-2 locomotives on the Madras & Southern Mahratta Railway.

American Locomotives for China

The Export & Import Bank has announced in Washington, states Reuters, that it would participate in the financing of the sale of 20 locomotives to China, costing $1,500,000. The bank will guarantee half of the amount, with the manufacturers extending credit for the balance. The entire loan will mature over a period of five years in monthly instalments, with interest at the rate of six per cent. The transaction will result in a visit to China of the president of the bank, Mr. Warren L. Pierson, and other Chinese orders are expected to follow. It was stated in America on June 18 that China had ordered 20 freight locomotives for the Tientsin-Pukow Railway. Ten are to be supplied by the Baldwin Locomotive Works and ten by the American Locomotive Company.

The A.B.C. Coupler & Engineering Co. Ltd. has received an order from the Rohilkund & Kumaon Railway, to the inspection of Messrs. Rendel, Palmer & Tritton for 100 wagon buffers.

The Chinese Government Purchasing Commission has placed orders through Matheson & Co. Ltd. to the inspection of Messrs. Fox & Mayo, with Reiss Brothers Limited, for cast iron flanged pipework and with Stewarts & Lloyds Limited for lap-welded steel tubes and elbows, required under the King Kan Railway Loan Agreement.

Tenders are invited by the Bikaner State Railway Administration, receivable by Messrs. Rendel, Palmer & Tritton, 55, Broadway, Westminster, S.W.1, by July 26, for the supply of rails, fishplates, fishbolts, steel sleepers, and keys.

The directors of the Great Western Railway Company have authorised the placing of the following contracts:—

At the South Wales Docks:

Vickers-Armstrongs Limited, Supply and erection of a pair of lock gates at the inner end of entrance basin, Barry docks.

Caffin & Co. Ltd., Reconstruction in reinforced concrete of No. 23 tip viaduct, No. 2 Dock, Barry.

The Patent Shaft & Axletree Co. Ltd., Supply of three wagon turntables for Nos. 23, 25 and 27 hoists, Barry docks.

English Electric Co. Ltd., Supply of a low-tension switchboard for pumps at Commercial Graving Dock, Barry.

Overhaul of the following vessels:

Penarth Pontoon & Slipway & Ship Ship Repairing Co. Ltd., Dredger *Don Federico.*

Port Talbot Graving Dock & Shipbuilding Co. Ltd., Dredger *David Davies* and launch *Aberavon.*

The supply of the following road vehicles:—

Express Motor & Body Works Limited, One Morris two-ton chassis.

R. A. Lister & Co. Ltd., Seven Lister "C.S." auto trucks, and two Lister "C.L." auto trucks.

W. Creed & Co., Extension of the parcels office at Slough station.

Wolverhampton Corrugated Iron Co. Ltd., Repairs to the goods shed roof at Reading station.

W. & A. Edgell Limited, Supply and erection of a timber-framed warehouse at Chepstow station.

Vaughan Crane Company, Supply and erection of a one-ton runway at the new mileage yard, Westbourne Park.

Railway Share Market

Aided by a further batch of good traffic figures and the better general trend of most sections of the Stock Exchange, Home railway junior stocks have moved in favour of holders since the beginning of the week. The impending half-yearly dividend statements and the decision regarding the claim for increased transport charges continue to be awaited in the market with considerable interest. Moreover, it is being assumed that a decision concerning the wages claims of the railwaymen can be expected next month.

Great Western was a good feature around 64, the growing output of the Welsh coal trade and talk of a possible increase in the half-yearly dividend having continued to influence sentiment. L.M.S. was also active, although the past week's traffics were slightly below expectations, and both the 4 per cent. preference and 1923 preference were inclined to make higher prices. Other preference stocks were also in better request, particularly L.N.E.R. second preference which was more active as a result of the particularly good increase of £112,000 in last week's receipts. The 4 per cent. first preference at 72½ shows a yield of around 5½ per cent. which seems unduly generous having regard to the trend of traffic receipts and the reasonable grounds for expecting increased cover for dividend requirements. Southern preferred at around 92½ offers a yield of nearly the same rate (the dividend of this stock is, of course, 5 per cent.) and would also seem moderately priced. Southern deferred was firmer this week, sentiment being influenced by continued anticipations that during the next few months the increase in traffic receipts is likely to be accelerated, granted weather conditions are favourable. London Transport "C" again made a lower price.

Argentine railway stocks were considerably firmer, but there were few individual features of importance. The cumulative preference stocks of the B.A. Pacific and Argentine Great Western have declined rather sharply in price since markets have been dull and are considered in some quarters to be well undervalued, having regard to the arrears of dividend carried. They cannot, of course, re-enter the dividend list until debenture interest payments are brought up-to-date. Cordoba Central debentures were again better on hopes of a definite decision before long with regard to the sale of the line. Elsewhere, Antofagasta ordinary was more active at higher prices. Canadian Pacific showed a better tendency in sympathy with the trend of New York markets.

Traffic Table of Overseas and Foreign Railways Publishing Weekly Returns

	Railways	Miles open 1936-37	Week Ending	Traffics for Week: Total this year	Traffics for Week: Inc. or Dec. compared with 1936	No. of Weeks	Aggregate Traffics to Date: Totals: This Year	Aggregate Traffics to Date: Totals: Last Year	Aggregate Traffics to Date: Increase or Decrease	Shares or Stock	Prices: Highest 1936	Prices: Lowest 1936	Prices: July 7, 1937	Yield (See Note)
				£	£		£	£	£					
South & Central America.	Antofagasta (Chili) & Bolivia	834	4.7.37	13,160	+ 30	27	440,390	364,740	+ 75,650	Ord. Stk.	25	15¼	20	Nil
	Argentine North Eastern ..	753	3.7.37	9,950	+ 1,831	1	3,840	5,102	− 1,262	„	12	2	10½	Nil
	Argentine Transandine ..	—	—	—	—	—	—	—	—	A. Deb.	54	45	85	411/16
	Bolivar	174	June, 1937	5,700	− 500	26	35,000	41,000	− 6,000	6 p.c. Deb.	9	5	8½	Nil
	Brazil	—	—	—	—	—	—	—	—	Bonds.	16	11½	15½	3¼
	Buenos Ayres & Pacific ..	2,806	3.7.37	78,846	+ 12,209	1	33,809	43,029	− 9,220	Ord. Stk.	17½	6	10½	Nil
	Buenos Ayres Central ..	190	19.6.37	$163,000	+ $62,500	51	$7,240,900	$5,442,700	+ $1,798,200	Mt. Deb.	31½	11	30	Nil
	Buenos Ayres Gt. Southern	5,084	3.7.37	119,975	+ 8,903	1	51,116	62,917	− 11,801	Ord. Stk.	31¾	13¾	25½	Nil
	Buenos Ayres Western ..	1,930	3.7.37	45,409	+ 3,933	1	15,942	19,508	− 3,566	„	29¾	11	23	Nil
	Central Argentine	3,700	3.7.37	133,536	+ 22,189	1	62,506	59,698	+ 2,808	„	32932	8¾	25½	Nil
	Do.	—	—	—	—	—	—	—	—	Dfd.	21	4½	11½	Nil
	Cent. Uruguay of M. Video	273	26.6.37	11,576	− 331	52	650,393	580,184	+ 70,209	Ord. Stk.	7¾	3	4	Nil
	Do. Eastern Extn.	311	26.6.37	2,635	− 161	52	135,746	109,682	+ 26,064	—	—	—	—	—
	Do. Northern Extn.	185	26.6.37	2,288	+ 497	52	96,393	77,831	+ 18,562	—	—	—	—	—
	Do. Western Extn.	211	26.6.37	733	− 207	52	49,339	45,185	+ 4,154	—	—	—	—	—
	Cordoba Central	1,218	3.7.37	41,190	+ 4,690	1	41,190	36,500	+ 4,690	Ord. Inc.	5	1	4½	Nil
	Costa Rica	188	Apr., 1937	20,677	+ 5,633	43	192,328	142,473	+ 49,855	Stk.	36½	32	36	59/16
	Dorada	70	May, 1937	14,000	+ 400	22	76,400	65,700	+ 10,700	1 Mt. Db.	107	101½	104½	5¾
	Entre Rios	810	3.7.37	13,002	+ 1,461	1	5,397	6,374	− 977	Ord. Stk.	17	6	11½	Nil
	Great Western of Brazil ..	1,082	3.7.37	6,700	+ 1,400	27	198,200	212,200	− 14,000	Ord. Sh.	1/2	5/16	1/2	Nil
	International of Cl. Amer. ..	794	May, 1937	$592,447	+ $55,571	22	$2,787,690	$2,617,518	+ $170,172	—	—	—	—	—
	Interoceanic of Mexico ..	—	—	—	—	—	—	—	—	1st Pref.	1/2	−/6	1/2	Nil
	La Guaira & Caracas ..	22¾	June, 1937	5,370	+ 910	26	33,705	27,340	+ 6,365	Stk.	9	3	7½	Nil
	Leopoldina	1,918	3.7.37	23,507	+ 2,573	27	590,186	452,146	+ 138,040	Ord. Stk.	10½	3½	5	Nil
	Mexican	483	30.6.37	$379,200	− $17,400	26	$8,031,200	$6,895,300	+ $1,135,900	„	1¼	1/4	1/2	Nil
	Midland of Uruguay ..	319	May, 1937	8,592	+ 2,259	48	96,366	78,833	+ 17,533	„	1½	1/2	1/2	Nil
	Nitrate	384	30.6.37	6,426	+ 586	26	86,845	69,560	+ 17,285	Ord. Sh.	63/6	41/9	2/8	Nil
	Paraguay Central	274	3.7.37	$5,588,000	+ $2,695,000	1	$1,487,000	$1,639,000	− $152,000	Pr. Li. Stk.	85	71	80½	77/6
	Peruvian Corporation ..	1,059	June, 1937	79,279	− 3,845	52	987,424	949,493	+ 37,931	Pref.	15	9	10½	Nil
	Salvador	100	26.6.37	¢12,900	− ¢1,300	52	¢1,231,008	¢984,936	+ ¢246,072	Pr. Li.Db.	18	16	22½	Nil
	San Paulo	153½	27.6.37	38,944	+ 5,565	26	838,975	756,796	+ 82,179	Ord. Stk.	86	46½	89½	511/16
	Taltal	164	May, 1937	3,310	+ 300	48	37,920	38,505	− 585	Ord. Sh.	115/32	14/−	11/8	87/9
	United of Havana	1,353	3.7.37	19,460	+ 1,622	1	7,700	9,626	− 1,926	Ord. Stk.	3¼	1	3	Nil
	Uruguay Northern	73	May, 1937	725	− 87	48	10,860	9,139	+ 1,721	Deb. Stk.	5	3	9	Nil
Canada	Canadian National ..	23,773	30.6.37	1,011,236	+ 94,091	26	18,999,262	17,092,285	+ 1,906,977	—	—	—	—	—
	Canadian Northern ..	—	—	—	—	—	—	—	—4 p.c.	Perp. Dbs.	76	51	69	515/16
	Grand Trunk ..	—	—	—	—	—	—	—	—	4 p.c. Gar.	104§	99§	9§½	4
	Canadian Pacific	17,228	30.6.37	726,600	+ 6,400	26	13,358,000	12,408,800	+ 949,200	Ord. Stk.	16§	101§/16	13	Nil
India,†	Assam Bengal	1,329	20.6.37	36,292	+ 1,126	12	285,591	275,543	+ 10,048	Ord. Stk.	87§	82§	74½	4
	Barsi Light	202	10.6.37	2,565	− 165	10	24,877	24,757	+ 120	Ord. Sh.	77½	65½	47	105/8
	Bengal & North Western ..	2,111	20.6.37	80,076	+ 6,728	12	733,477	682,094	+ 51,383	Ord. Stk.	319	292§/8	302	511/16
	Bengal Dooars & Extension	161	20.6.37	3,556	− 30	12	25,929	26,262	− 333	„	127½	118	97½	5§/8
	Bengal-Nagpur	3,268	20.6.37	186,450	+ 17,262	12	1,628,950	1,485,031	+ 143,919	„	104	100¼	90½	47/16
	Bombay, Baroda & Cl. India	3,072	30.6.37	237,750	+ 29,700	13	2,491,725	2,314,650	+ 177,075	„	114	110½	110½	57/16
	Madras & Southern Mahratta	3,229	10.6.37	157,275	+ 2,230	10	1,197,975	1,189,973	+ 8,002	„	116½	108½	107½	77/16
	Rohilkund & Kumaon ..	572	20.6.37	15,171	− 105	12	142,577	146,723	− 4,146	„	311	286	302	511/16
	South Indian	2,531¾	31.5.37	127,155	+ 3,481	9	709,317	706,330	+ 2,987	„	107½	102§/16	100½	5½
Various	Beira-Umtali	204	Apr., 1937	82,745	+ 22,033	31	501,230	442,973	+ 58,257	—	—	—	—	—
	Egyptian Delta	620	10.6.37	6,234	+ 616	10	43,418	39,590	+ 3,828	Prf. Sh.	2¼	1§/8	1½	Nil
	Great Southern of Spain ..	—	—	—	—	—	—	—	—	Inc. Deb.	1½	1/3	3½	Nil
	Kenya & Uganda	1,625	May, 1937	216,935	− 20,539	22	1,334,126	1,229,899	+ 104,227	—	—	—	—	—
	Manila	—	—	—	—	—	—	—	—	B. Deb.	50½	37	45	7¾
	Midland of W. Australia ..	277	May, 1937	11,590	− 359	48	144,239	149,411	− 5,172	Inc. Deb.	97	93½	95	4§/16
	Nigerian	1,905	15.5.37	55,892	+ 20,911	7	422,866	225,937	+ 196,929	—	—	—	—	—
	Rhodesia	2,451	Apr., 1937	410,583	+ 130,476	31	2,520,488	2,006,253	+ 514,235	4 p.c. Db.	107	103½	107½	3¾
	South Africa	13,263	12.6.37	630,916	+ 30,283	11	6,436,950	5,982,714	+ 454,236	—	—	—	—	—
	Victoria	4,728	Nov., 1936	868,988	+ 45,953	21	3,995,540	3,959,297	+ 36,243	—	—	—	—	—
	Zafra & Huelva	112	Apr., 1937	13,304	+ 4,300	17	57,316	39,754	+ 17,562	—	—	—	—	—

NOTE.—Yields are based on the approximate current prices and are within a fraction of 1/16.

† Receipts are calculated @ 1s. 6d. to the rupee. § ex dividend. Salvador and Paraguay Central receipts are in currency.

The variation in Sterling value of the Argentine paper peso has lately been so great that the method of converting the Sterling weekly receipts at the par rate of exchange has proved misleading, the amount being overestimated. The statements are based on the current rates of exchange and not on the par value.

The weeks traffics include 4 days of last year.

Diesel Railway Traction

M-V-C

IT has been common knowledge for some months that the Metropolitan-Vickers Electrical Co. Ltd., in conjunction with the Metropolitan-Cammell Carriage & Wagon Co. Ltd., had taken out a licence for Ganz diesel railcars and that a vehicle was being erected at Birmingham. After several runs over L.M.S.R. lines this railcar, known as the Metro-Vick-Cammell car, was given its first public demonstration run on June 30 between Euston and Tring, and arrangements are now being made for it to go into regular operation in this country.

Built up on the same general lines as the *Arpad* car which operates the 56 m.p.h. service between Budapest and Vienna, this unit is the first British diesel railcar to have a large bogie-mounted engine and the first to incorporate mechanical transmission with an engine of over 200 b.h.p. Otherwise one might say that it was essentially British in its details, even down to the deep ventilating lights above the main fixed windows. Thanks to the extreme care taken to insulate all sources of noise and vibration from the passenger saloon, even a lengthy ride is not disturbed by untoward sounds or smells, although passage over frequent points and crossings may indicate to the observant traveller that the bogies are of the non-bolster type. No attempt has been made to cut the weight down to the bare bones, but on the purely moderate tare weight of about 32 tons have been obtained body and bogie structures of very great strength, thanks to the use of alloy steel built up entirely by electric welding. One of the principal features of the car, so far as we have been able to judge, is the way in which the two British companies have followed the lines indicated by Ganz experience, and have introduced no feature which has not been thoroughly tried out under various conditions. Even the engine itself was actually built at the Ganz works, but production of engine and transmission equipments has now begun at Trafford Park.

South American Markets

MANUFACTURERS of diesel railcars and locomotives have always looked on South America as a vast potential market for their wares, and after a long wait that market is developing before their eyes at a rate which few of them can have anticipated. It is true that not all of the orders originating from British-controlled companies have come to this country, although our factories have received an appreciable share of the work going, but in any case it would be a matter for grave concern if all the skill and ability of British concerns was to be put into goods intended not for the benefit of our own race, but for export. Beginning with the 108 Drewry railcars ordered by Argentine railways in September and October last, South American railways have taken the bit between their teeth and placed orders for diesel railcars, trains, and locomotives to a value which cannot be far short of £1,000,000, and have taken delivery of a variety of cars ordered previously. Moreover, further developments are likely in the near future, and there seems to be a tendency for the intense activity now centred in Argentina to spread north to Brazil and west towards the Pacific seaboard. Technically, at least, added interest should be gained by this permeation of the advantages of oil-engined railcars, for the requirements of the lines rising to 10,000 ft. or more above the Pacific will be something different from those of the low-lying railways round La Plata, and the nature of the traffic should enable them to show up to at least equal advantage. Round La Plata the most recent progress has been in the direction of multi-unit trains, and it is evident that diesel traction is not going to be relegated merely to the solution of branch line problems, but will be expected to take its share in effecting economies on interurban and main lines.

Multi-Step Gearboxes

IT is, perhaps, a mark of the times that the Metro-Vick-Cammell railcar, described elsewhere in this issue, should be fitted with a *five*-speed gearbox, for there has been a decided tendency during the past 12 or 18 months to increase the number of steps above four, which was the previous normal maximum. Such an increase, of course, means a lesser variation in the engine speed and a shorter break in the tractive effort curve while making a gear change, and may mean a material increase in the capacity of the car when working over a sharply undulating line. A multi-stage box, further, tends to eliminate that error of choice in the characteristics of one stage in the gears which has handicapped several railcars with mechanical transmission. An extension beyond five stages is now being carried out, and Minerva, Fiat, Maybach and Cotal all have boxes of 6 to 8 speeds, the Cotal 8-speed box being designed to take up the torque of an engine with a continuous rating of 450 b.h.p. at 1,500 r.p.m. Some makers, such as Ardelt and Minerva, favour special devices, rather than an increase in the number of gearsteps, to reduce the time of gear-changing and to get an uninterrupted curve of tractive effort. Others again, *e.g.* Winterthur, provide an intermediate position between neutral or first gear, or, like Renault, arrange for the clutching time to be slightly increased between neutral and first, in order to facilitate starting. It would appear that the engine speed should not fall below 0·6 of its rated value during gear changing, and this requirement can be satisfied with any of the five-speed boxes now on the market. The box with five or more steps is used not only on high-speed cars, for there are examples with a top speed of 45 m.p.h. in which five steps are used to advantage, but there has been a move towards fitting all new medium or high power railcar engines with multi-step drive where they are to be used in conjunction with mechanical transmission.

ANOTHER MYLIUS GEARBOX DEVELOPMENT

Five-speed transmission with simple controls and double-end drive for powerful railcars

SINCE the Mylius mechanical transmission was first applied to a petrol railcar in Holland 13 years ago it has grown steadily in popularity, until there are now about 750 sets in railway service, transmitting the torque of engines varying in output from 65 to 350 b.h.p. These Mylius drives are of various types, some being bogie-mounted, others underframe-mounted with final drives to bogie axles, and others underframe-mounted with drives to rigid axles. The latest type has been evolved for application to big railcar engines of 400 to 500 b.h.p., and in addition to the size, there is another distinctive feature in the double-way drive, allowing two axles of a bogie to be driven whether the power-transmission unit is mounted on that bogie or on the underframe or on a subframe beneath the car body. The same box can be arranged for single-end drive only if this is desired.

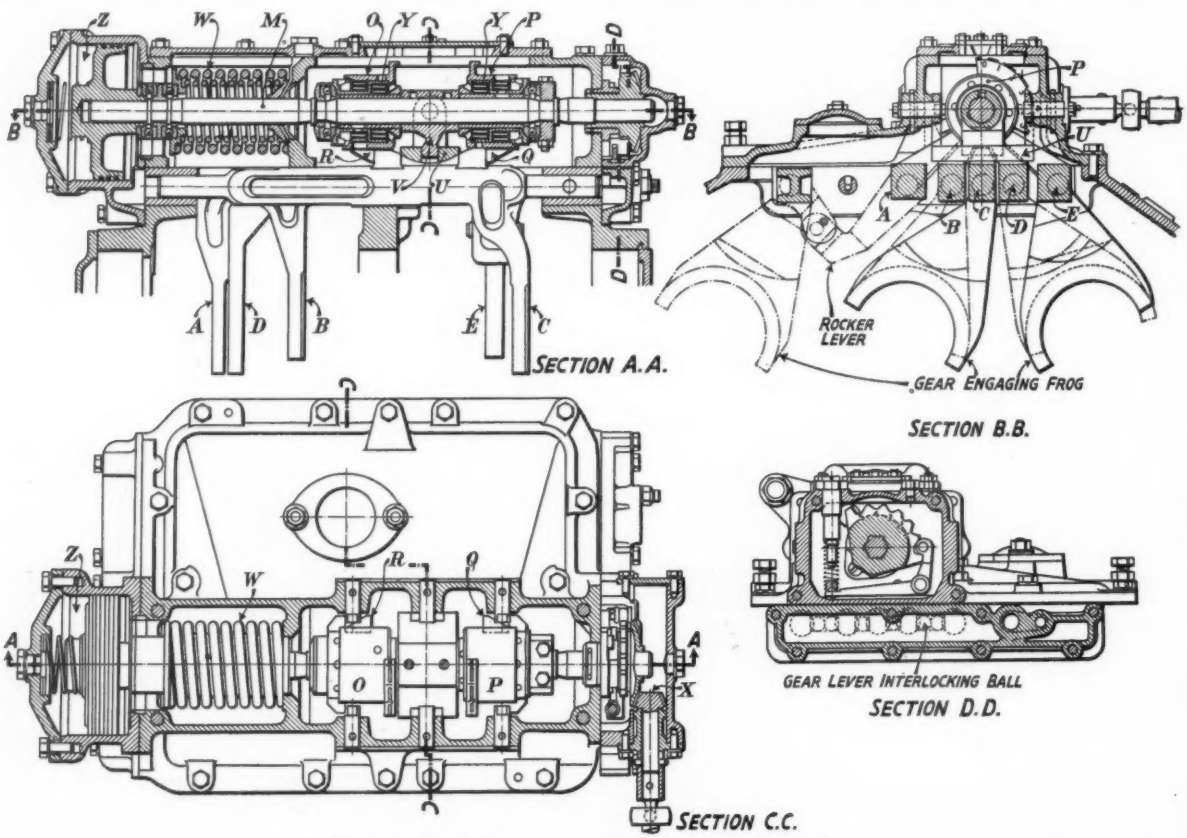
Compact Design for Large Box

This latest type of box, with the Mylius Gw classification, is shown in the accompanying sectional drawing and, in position, in the bogie layout diagram. It is in use already in Germany and France. The main clutch is of the multi-plate pattern, and is disengaged by an air-operated rubber diaphragm; engagement is effected by eight coil spring sets provided at the outer end of the clutch. In order to ensure a more compact design, as well as easy adjustment, replacement, and inspection, the clutch is mounted close to the gearbox on the side opposite to the engine, so that a direct shaft *I* is provided through the gearbox in connecting the main clutch with the engine flywheel, and is surrounded by a hollow gear-carrying shaft *Ia*.

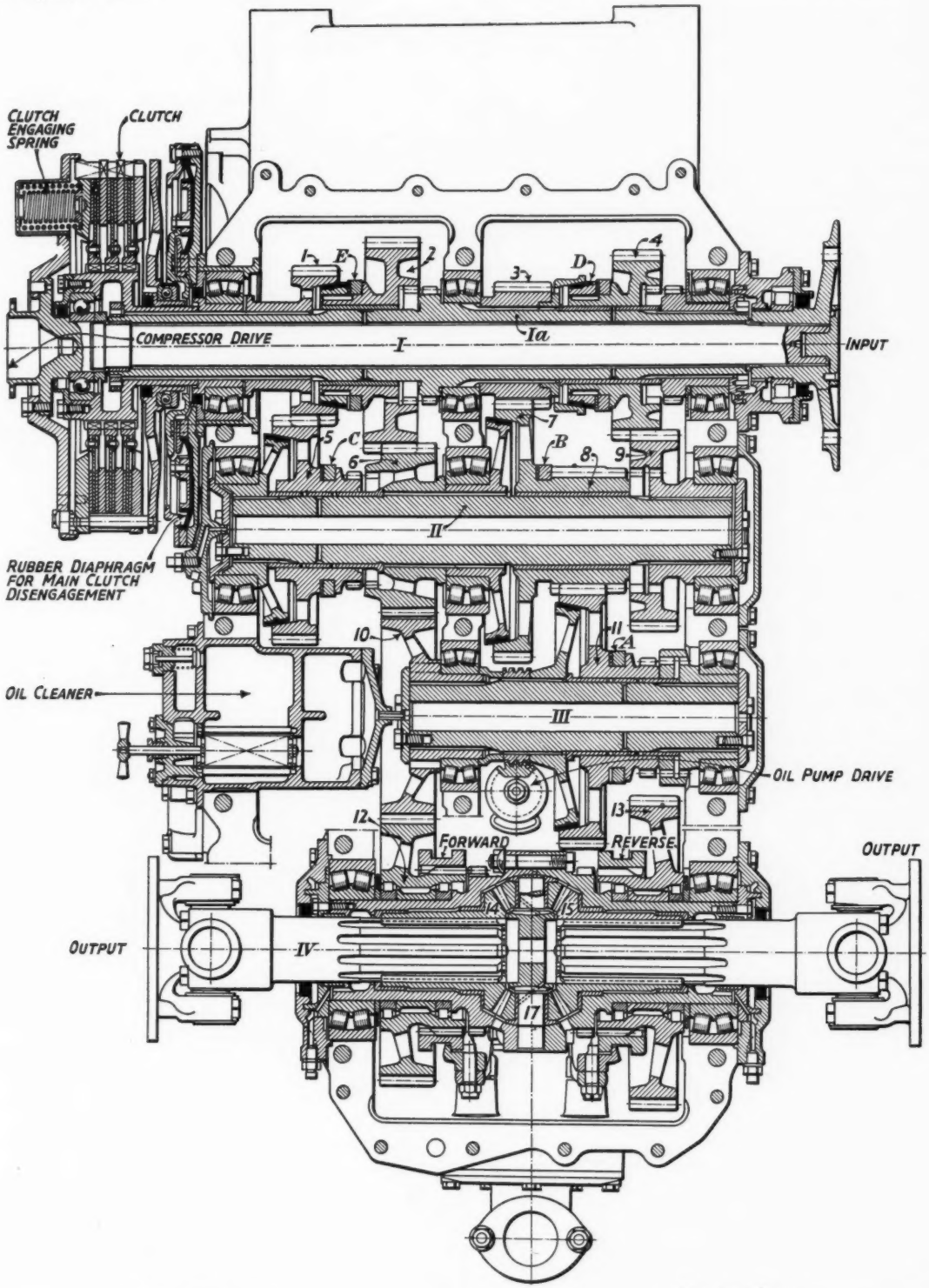
The five-speed double-end drive gearbox has a total of four shafts, *I, II* and *III* being arranged in a horizontal line, and shaft *IV* being located underneath between shafts *II* and *III*. The shafts *I* and *II* carry four trains of constant-mesh gears, but only two trains are carried on each of the remaining shafts. The wheels *1, 3, 6, 9* and *10* are keyed to their shafts, but wheels *2, 4. 5, 8,* and *11* are free to slide and are provided with a half-claw clutch on the right side and a synchronising cone clutch on the left side.

Pre-selection

Gear changing is effected pneumatically through the medium of the cylinder *Z* fixed on the top of the gearbox. The driver pre-selects any speed desired, either mechanically by turning a handle which, by means of steel cables, actuates the pinion *X*, or, with cars running in multiple-unit, by means of electrically-controlled air cylinders fixed on the top of the gearbox. In order to effect a gear change the pinion *X* is turned and rotates the shaft *M* until the



Details of Mylius Gw type gearbox and selection levers



Forward Gear			Reverse Gear		
Gear Step	Frog Operated	Wheels	Gear Step	Frog Operated	Wheels
1	A	3-7-8-11-10-12	1	A	3-7-8-11-10-6-9-13
2	B	3-7-6-10-12	2	B	3-7-9-13
3	C	1-5-6-10-12	3	C	1-5-9-13
4	D	4-9-6-10-12	4	D	4-9-13
5	E	2-6-10-12	5	E	2-6-9-13

Sectional arrangement of the latest Mylius five-speed gearbox

projection *R* on the loose right drum *O* opposes the face of whichever one of the gear shifting fork rods *A, B, C, D,* or *E* has to be actuated. This spans the spiral springs *Y* in the second drum *P*, which cannot move as the corresponding projection *Q* is pressed against the shifting rod of the gear in operation. The gear change is effected by admitting compressed air to the rubber diaphragm of the main clutch, which thus becomes disengaged, and also by actuating the piston of the cylinder *Z*, thus moving the shaft *M* to the right against the pressure of spring *W*, and disengaging by means of the finger *V* and the rocking cradle *U* the hitherto engaged gear.

By a further movement of the shaft *M* the projection *R* pulls the shifting rod of the pre-selected gear, thus engaging its cone clutch with the corresponding face on the fixed wheel and thus causing the loose wheel to run at the speed of the shaft, which now is driven from the car wheels. Meanwhile, projection *Q* on drum *P* has slid away from its obstruction and is turned by its springs *Y*, spanned when pre-selecting, so as to face the rod of the gear to be engaged. If the air is now released from cylinder *Z*, the spring *W* will pull the shaft *M* back to the left, which will at first disengage the synchronising cone clutch and then engage the claw clutch, an easy engagement of which is ensured by the fact that as the loose wheel after synchronisation gradually tends to assume a different speed, as against the fixed wheel, slipping in of both clutch members is carried out easily with an entirely shockless engagement.

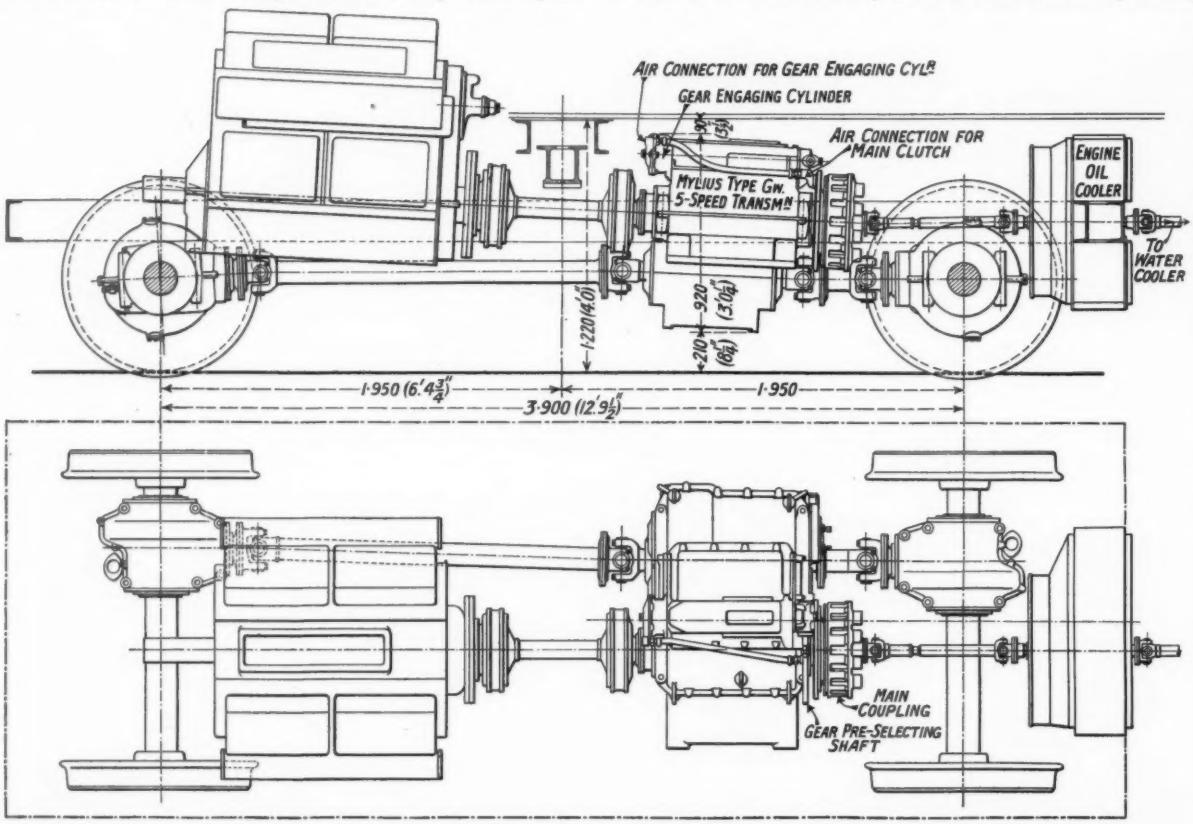
After the pre-selected gear has been engaged, the main clutch is also applied in releasing the air from the diaphragm, a very soft engagement being effected at the driver's will by the gradual release of the air pressure. This change of gears being completed, any other speed can be engaged by first pre-selecting it, and then admitting and releasing air pressure in the main clutch and operating cylinder, pre-selection of any gear being possible while the engaged gear is running.

Reversing is effected by engaging either wheel *12* or *13* with the shaft *IV* by means of claw clutches; these clutches are pneumatically operated by a double-piston cylinder, which can be actuated only with the car at rest. The shaft *IV* is provided with a differential gear, *14* and *15*, in order to eliminate any stress which may develop due to unequal diameter of the driving wheels.

Gear Losses and Efficiency

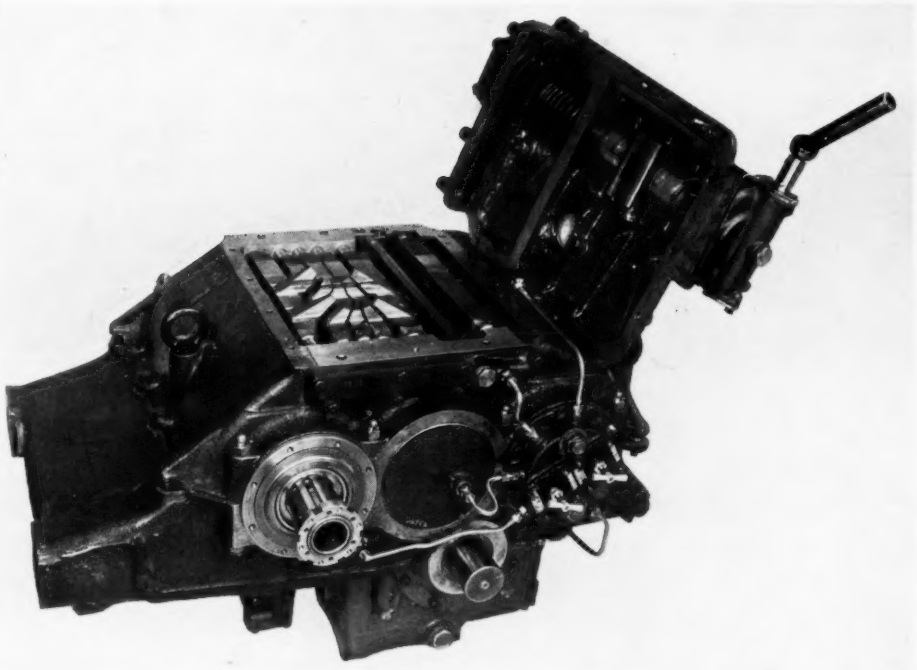
It has been found that most of the gear losses are due to squeezing oil from between the teeth for about one thousandth of a second. The gearbox is fitted with a small oil pump located inside the gearbox and driven from shaft *III*; this sprays the oil from the sump through a nozzle on to the gears at the point of engagement, thus effectively reducing the so-called oil splashing losses. The loose gear wheel bearings are lubricated through the hollow shafts and two sets of removable oil cleaners are provided. The engine oil and water cooler, as well as the brake air compressor, may be driven by a shaft connected to the driving end of the main clutch. The gear ratios in the box illustrated are 4·83, 2·11, 1·92, 1·37 and 1·02 to 1 including the reversing gear, while the weight of the gearbox together with the main clutch is about 3,000 lb.

Gear changing is performed by the driver in pre-selecting the gear to be engaged by means of a centrally-located handle on the control desk, engagement being performed by a simultaneous operation of the engine throttle handle and a combined gear and main clutch operating

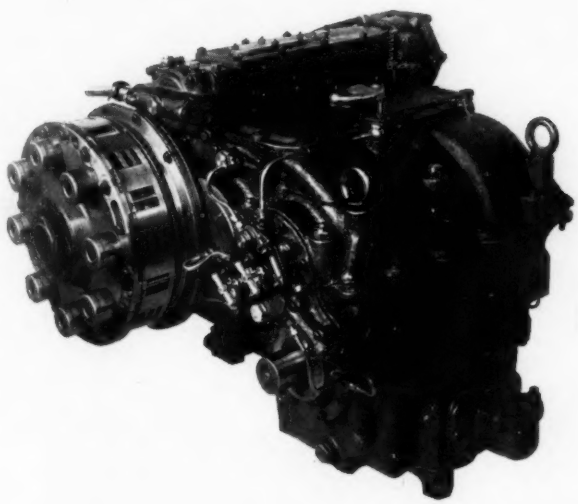


Layout of an engine and Mylius gearbox of 400 b.h.p. on a railcar bogie

Right: 350 b.h.p. Mylius five-speed gearbox with double-end drive; cover lifted back to show gear-changing rods



Left: Outside view of Mylius five-speed gearbox and friction-type main clutch to transmit 350 b.h.p.



valve, both handles being at first pulled in slowing the engine down and admitting air to clutch and gear operating cylinder, and then pushed back to increase the engine speed and release the air. This engages both the gear selected and the main clutch, the whole operation requiring $1\frac{1}{2}$ to 2 sec. The gear wheels and shafts are made of high-quality case-hardening alloy steel. The wear of the synchronising cone clutches, which when applied have only to deal with the gear to be engaged and the part of the main clutch attached to the gearbox, is very small.

A high efficiency is ensured by the simple gear design, some 4 h.p. being lost when running idle at a speed of 2,000 r.p.m., while the total efficiency of the type Gw gearbox is about 94 per cent. in the first forward and 95 per cent. in the first reverse speed, increasing to 97 per cent. and 96 per cent. with the second to fifth speed respectively; the losses at the axle drives are about 2 per cent. of the power transmitted.

DIESEL LOCOMOTIVE FOR BRAZIL.—The English Electric Co. Ltd. has received an order for two 450 b.h.p. 1-Do-1 diesel-electric locomotives for the metre gauge lines of the Eastern Railways of Brazil centred on Bahia.

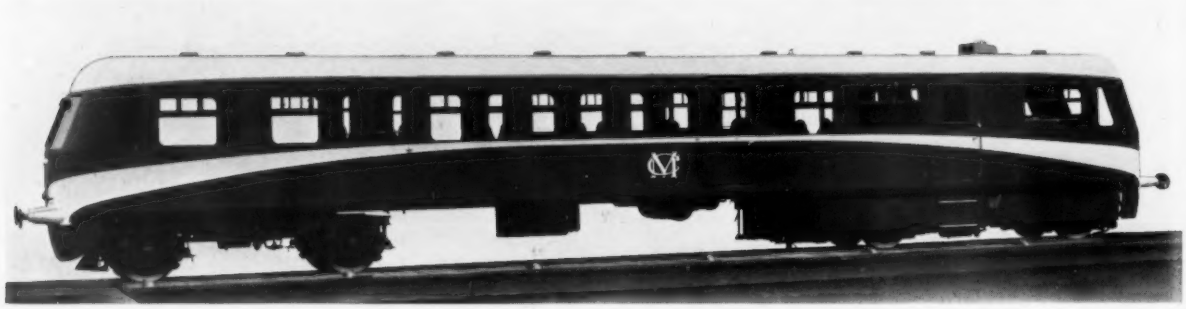
FRENCH RAILCAR CONSTRUCTION.—Among the railcars on order for the Chemin de fer de l'Est are three twin-articulated 600 b.h.p. Renault trains (similar to the P.O.-Midi sets described elsewhere in this issue); six twin-engined and one single-engined Renault cars; and eight twin-engined De Dietrich cars, some of which are delivered. In addition, eight twin-engined "standard" cars were delivered during the first half of the year.

FRENCH ORDER.—The P.O.-Midi Railway has passed an order for 10 double-bogie single-engined Renault railcars of 500 b.h.p., to be equipped with mechanical transmission, and an order for 5 Renault diesel-mechanical cars each to be powered by two 300 b.h.p. engines. Both types of cars are to be used for trailer haulage.

MORE DREWRY ORDERS.—The Drewry Car Co. Ltd. has received orders for eleven 0-4-0 diesel-mechanical shunting locomotives from the Buenos Ayres Great Southern Railway, and for three locomotives of the same type from the Buenos Ayres Western Railway. All these units will be provided with the well-known power-transmission equipment comprising a 102 b.h.p. Gardner engine, Vulcan-Sinclair fluid coupling, and Wilson-Drewry epicyclic gearbox with pneumatic control at each side of the cab.

A NEW BRITISH RAILCAR

Five-speed mechanical transmission with remote control is a feature of this new vehicle, which is built to designs proved successful in units aggregating over 100,000 b.h.p.



General view of the latest British diesel railcar

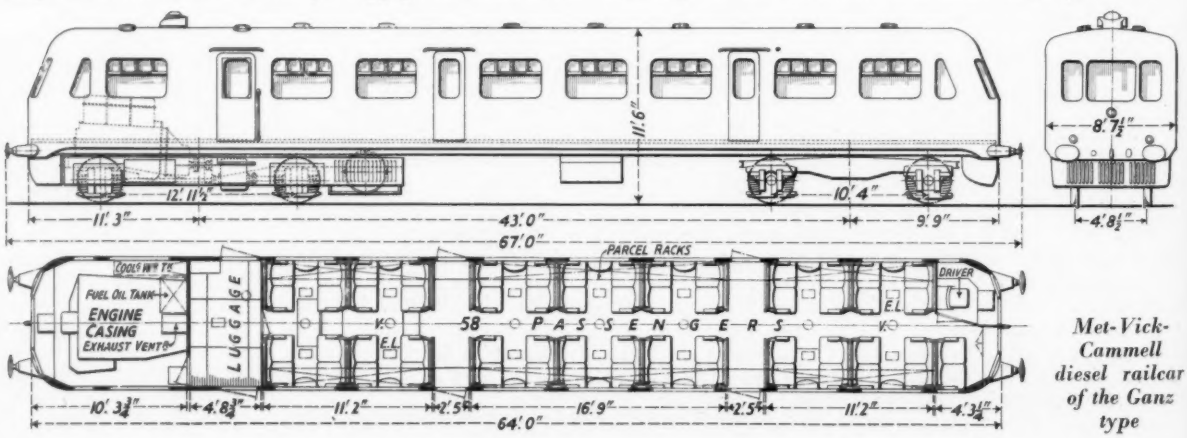
BUILT up from the design of the celebrated Ganz *Arpad* car of the Hungarian State Railways, the new diesel-mechanical railcar built by the Metropolitan-Cammell Carriage & Wagon Co., Ltd., in conjunction with the Metropolitan-Vickers Electrical Co. Ltd. has been arranged to suit certain definite operating requirements in this country, but the design of the car is such that a number of different conditions can be satisfied without any basic alterations in the construction or characteristics. The essential features of the Metro-Vick-Cammell railcar are one power bogie containing the engine, transmission and a number of the auxiliaries; a trailing bogie; integral all-welded body and underframing; multiple-unit control; ability to haul a trailer; and a top speed of 75-80 m.p.h. Much attention has been paid to the structural strength of the car, and with a tare weight of over 30 tons the b.h.p. per ton of tare on the continuous rating is about 7·7, or 6·2 b.h.p. per ton of gross weight with a full complement of passengers.

Carriage Portion

The layout of the car interior provides 58 seats in one long saloon, with two entrance vestibules on each side; one set of these leads first into a small luggage compartment which separates the engine room from the passenger saloon. Entrance and exit are through outside-swing doors, of which those in the luggage vestibule have balanced drop windows. The luggage compartment is provided with all the usual fittings, including guard's seat, letter rack, ambulance box, hooks and dog rings. There is a push button for bell communication with both driving positions, and an air brake valve. The floor is covered with hardwood slats.

The interior panels of the passenger saloon are of mahogany-faced plywood polished in natural shade, and all window and door frames are of bent walnut polished in a rich brown shade. The mouldings, which have been kept to the minimum, are also of polished walnut. The ceilings are of Sundeala hardboard, covered with scratch-proof Rexine of a cream shade. The floor, comprised of tongued and grooved boards secured to the underframe, is covered with cork carpet on top of which is laid rubber, the colour of which harmonises with the general scheme of decoration.

The seats are of the Met-Cammell back-to-back type with tubular frame construction; they are of the semi-bucket type with separate cushions upholstered in brown and blue shaded moquette. All exposed metalwork is chromium plated. The parcel racks, handpoles and guard rails are all of tubular design, chromium plated, and harmonise with the general scheme. The side windows are arranged between each pair of seats, and are fixed with top sliding ventilators of the deep type used extensively on the L.M.S.R. and other railways.



Met-Vick-Cammell diesel railcar of the Ganz type

Interior of the one-class open saloon of the new Metro-Vick-Cammell railcar. This saloon, seating 58 passengers within a length of 48 ft. 6 in., is completely isolated from engine noise and smell

Small glass-topped tables with ash trays on each side are secured to the side panels below the windows, and oval mirrors are fixed on the end partition of the passenger saloon and also on the door leading to the luggage compartment. Ventilation is effected by Monarch extractors above the grids in the ceiling, and, of course, by the side ventilators above the windows. The roof lights are arranged in two rows and each fitting has twin bulbs covered by an opaque shade.

At the trailing bogie end of the passenger saloon is a half-width driving compartment equipped with a full set of controls and instruments, and having an electrically-operated Whipple wind-screen wiper. The heating of the car is effected by the engine cooling water which is passed through gilled tubes running down each side of the saloon. Communication cords of the usual railway patterns are arranged above each side door. Trap doors are located at various points down the floor of the saloon to enable various details of the bogies and auxiliaries to be inspected; they have special locks, and sealed edges to keep out noise and dust.

The type of integral body and underframe evolved by Ganz and followed by Metro-Cammell is an entirely welded structure of alloy steel in the form of a Vierendeel girder. The steel outer panel plates are electrically-welded to the frame members and, with the steel roof

Driving position at the engine end of the 240 b.h.p. single-engined railcar, showing in the centre of the dashboard the gear-changing and fuel-regulation handles. The neat arrangement of the hand screw brake wheel will be noted

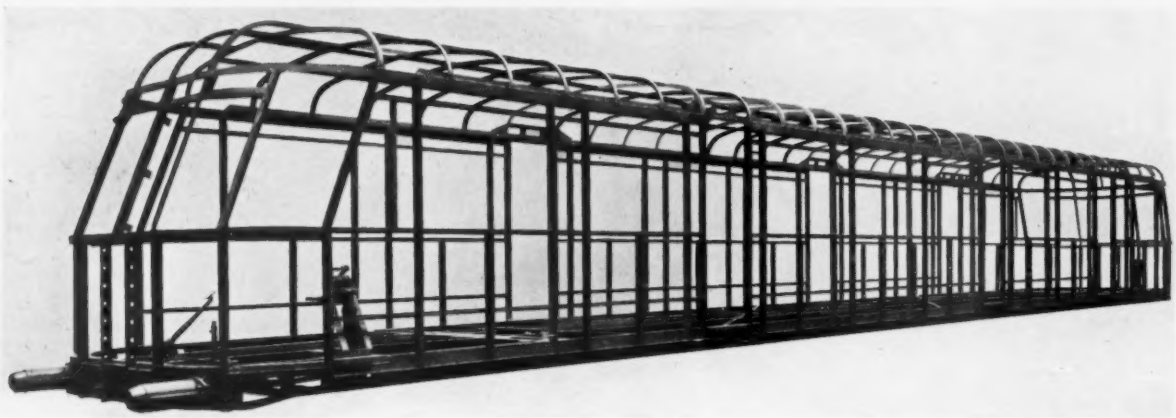
sheets, make an appreciable contribution to the strength of the complete structure. A careful consideration of the materials available resulted in the choice of a high-chrome steel having a tensile strength of 32 to 38 tons per sq. in., a yield point of 22½ to 25½ tons per sq. in., and an elongation of 21 to 18 per cent. on ten diameters. (19 to 16 per cent. in the direction transverse to that of rolling.) In addition to the relatively high yield point, a further advantage of this steel is its high resistance to corrosion. As will be seen from an accompanying illustration the lower portion of the framing has four longitudinal members, the two main members being on the outside and swept round at each end to form the headstock. The light yet rigid design of the cross members will be noticed also, and this form of construction is a result of the adoption of welding, for in place of a full channel section two angles with welded stretchers are used.

The upper and lower chords of the body girder, that is, the roof and the underframe, are the main load carrying members. It will be noticed from the illustration of the complete body framing that there are no diagonal members between the floor and the waist rail, but the square panels are of small dimensions and the function of diagonal bracing is performed by the outer panel plates. The inside surfaces of the panel plates are sprayed with cork as an insulation and to prevent condensation, and the outside is finished in Docker Bros. Syntholux paint in maroon and cream. The ends of the underframes are suitably reinforced to carry the buffers and centre draw-hook, and they also take a light steel plate curtain round the front of the bogie.

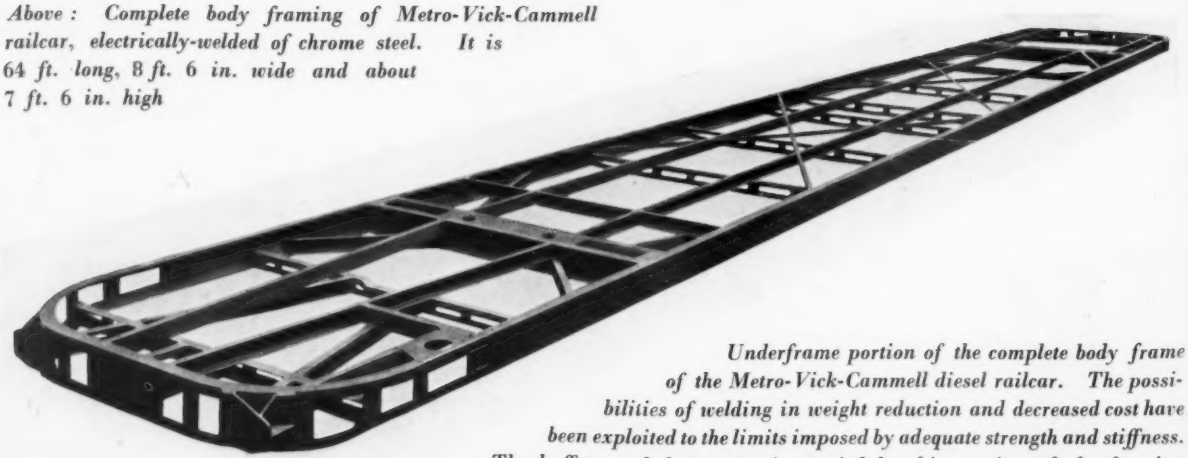
Bogies

Both driving and trailing bogies are alike in that they are of the non-bolster type and are built up on a structure of all-welded alloy steel on which is housed the complete brake gear. The alloy steel is of the chrome type, as used for the body framing. Because of its function of carrying the engine and transmission, the power bogie has a wheelbase 2 ft. 7½ in. longer than that of the trailing bogie, but the wheels of both are of the same diameter, 36 in., and have separate tyres.

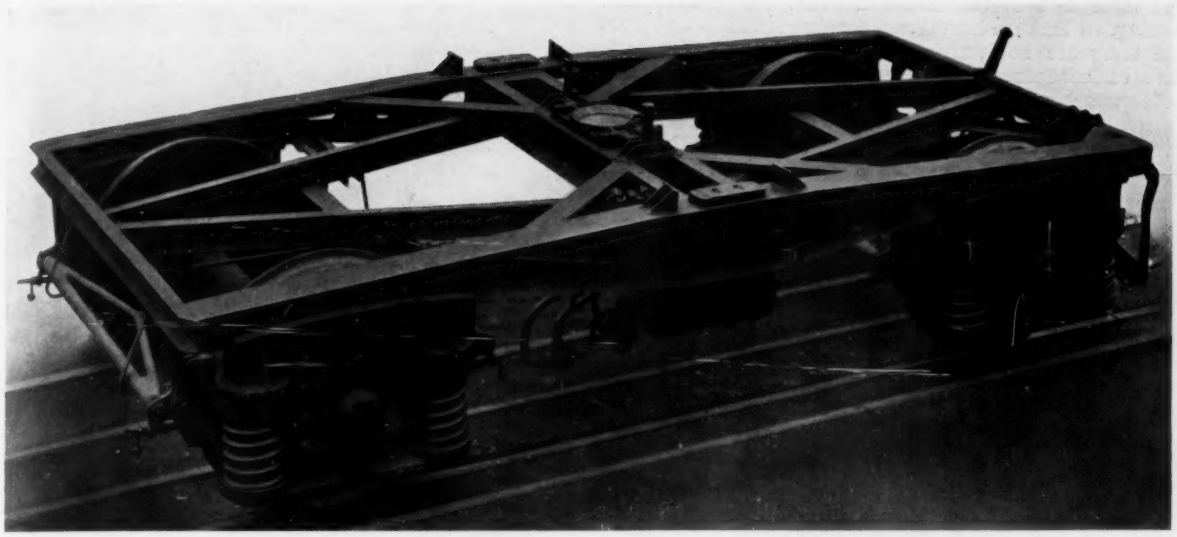
The desiderata in evolving the design of the bogies were that, despite the long wheelbase resulting from the carriage of the power-transmission equipment, there should be not the slightest deformation of the structure from the concentrated vertical and horizontal loads due to the weight of the car body and the centrifugal force arising from that mass, while at the same time providing a good guiding action without detrimental rolling action or lateral play. The main side girders therefore have been made of box shape with an ample depth, and are formed of top and bottom channels connected by welded side pieces. These longitudinal girders are rigidly braced by cross stays of channel, angle and bar sections. With this type of construction the centres of the axleboxes and journals coincide with the centres of the frames, and thus



Above: Complete body framing of Metro-Vick-Cammell railcar, electrically-welded of chrome steel. It is 64 ft. long, 8 ft. 6 in. wide and about 7 ft. 6 in. high



Underframe portion of the complete body frame of the Metro-Vick-Cammell diesel railcar. The possibilities of welding in weight reduction and decreased cost have been exploited to the limits imposed by adequate strength and stiffness. The buffing and draw gear is carried by this portion of the framing



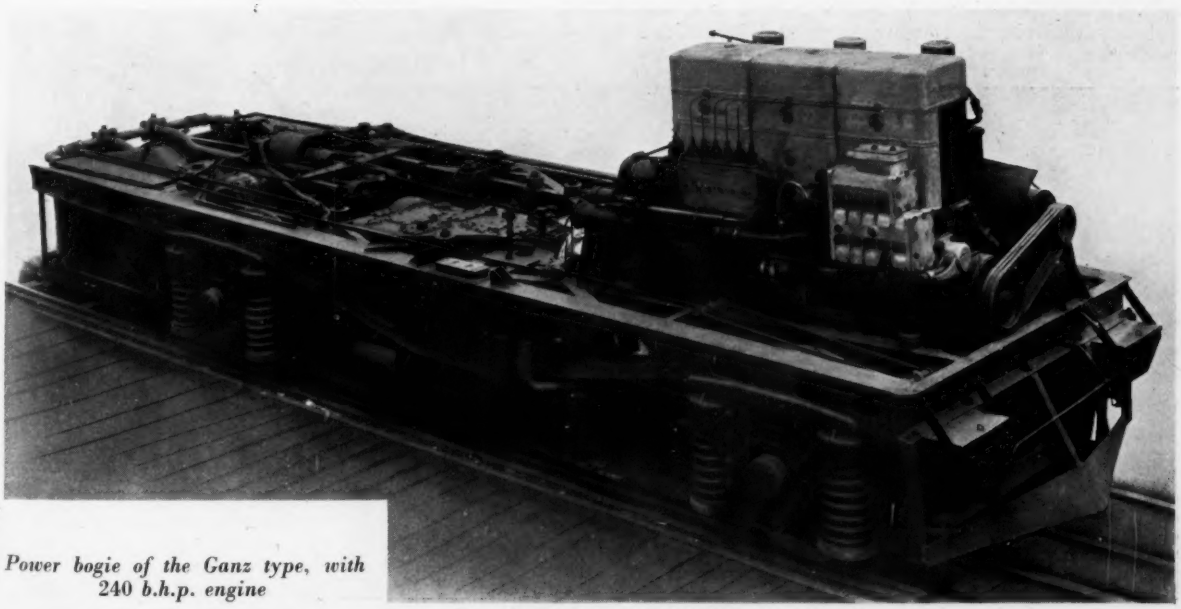
Trailing bogie of the Metro-Vick-Cammell diesel-mechanical railcar

there is no bending moment introduced in the transfer of the load. The axleboxes in this application are of the Skefko double-row self-aligning roller type.

Helical springs with rubber pads are used exclusively in the suspension systems of the driving and trailing bogies. Each axlebox is supported by two groups of triple helical springs, which are connected by a short equalising lever pivoted below the axlebox. The two outer springs of each set carry the normal load, and serve to take up the usual periodic vibrations such as those from rail joints. When additional forces, such as those arising from centrifugal force on passing round curves or through points at speed, are present, the inmost spring (which has a shorter free length than the others) begins to carry load, and the deflection of the spring group per unit of load is decreased.

Ample guiding surfaces for the axleboxes are required when helical springs are used alone, and the large surfaces made possible by the use of the box girder type of bogie frame assist in damping out some of the oscillations. Accurate guidance and paralleling of the pairs of wheels is assisted further by the manner of the support given to the journal by the axlebox, provision being made for the axle to adjust itself in the roller bearing.

Rubber cushions are used extensively in the suspension of the bogie in order to damp out vibrations of small magnitude and high frequency, and to reduce noise, and in this they seem to have been successful, for out on the line the Metro-Vick-Cammell railcar has proved almost noiseless so far as the passenger saloon is concerned. By the provision of double rubber cushions above the axlebox springs the non-sprung masses are isolated from the springborne portion, and the bogies themselves are isolated from the car body by a series of rubber cushions below the hemispherical pivots. These rubber blocks



Power bogie of the Ganz type, with 240 b.h.p. engine

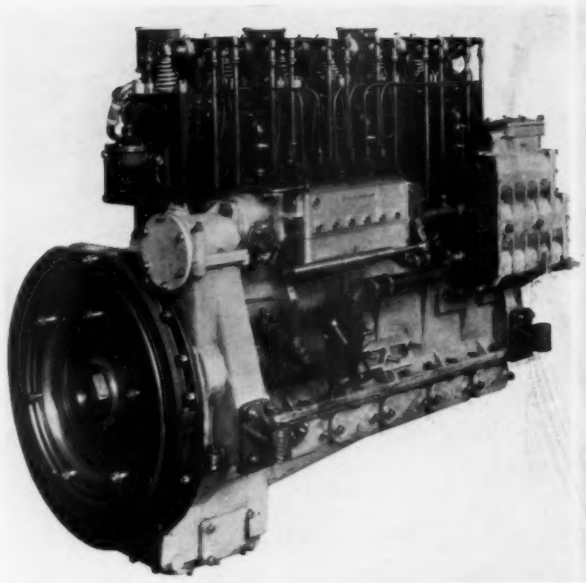
are fitted also to the side and end faces of the pivot casting, so that the lateral and tractive forces to and from the body are not transmitted through metallic contact. As a further refinement, the fixing bolts are provided with rubber washers, and the side bearers have rubber pads.

Air brakes with cylinders, auxiliary reservoirs, and actuating valves of the usual type are fitted to each bogie, and apply two blocks on each wheel. At each end of the car is a hand screw brake which applies the blocks of the adjacent bogie only. Two drivers' brake valves are fitted in each driving position, one for the automatic brake and the other for a direct brake application in case of emergency. The main air reservoirs are carried on the car underframe. Air is taken from the brake system for the operation of the main and gearbox clutches, the fuel supply, an air horn, and the sanding gear.

The Engine

Mounted on the driving bogie frame structure through the intermediary of double rubber blocks, which prevent the transmission of engine vibrations to the car body and protect the engine from shocks from the rails, is a Ganz VI JaR 170/240 oil engine. This type of engine is now under production in the Metro-Vick works at Trafford Park, and future railcars will be powered by Metro-Vick-Ganz engines. The Roman numeral in the engine type number gives the number of cylinders, and the last two figures the bore and stroke (in millimetres) respectively. The continuous rating of the Ganz-Jendrassik engine is 240 b.h.p. at 1,250 r.p.m. and the normal maximum 275 b.h.p. at 1,450 r.p.m. Actually, a peak output of 310 b.h.p. at 1,450 r.p.m. has been attained. On the continuous rating the weight is about 20 lb. per b.h.p., the piston speed 1,800 ft. per min., and the brake m.e.p. 83 lb. per sq. in.

The crankcase is a light alloy casting carrying seven main bearings of lead-bronze and whitemetal. Above the crankcase are mounted three cast iron cylinder blocks, each consisting of two cylinders, and above these again are the cast iron cylinder heads, also cast in pairs. Each cylinder head contains one inlet and one exhaust valve driven by the usual rockers and push rods from a gear-driven camshaft located in the upper portion of the crankcase. There is a special dashpot balancing mechanism to eliminate any play between the rockers and the push rods. The cylinder heads have pre-combustion chambers, and any difficulty in starting from cold is avoided by a retarded opening of the inlet valve. An appreciable vacuum thus is created in the cylinder during the first part of the suction stroke, and when the air is admitted its temperature is raised considerably by the fact of it flowing into a vessel subjected to a lower pressure. A special set of cams is provided for this purpose, and they are changed to a normal setting as soon as the engine is firing.

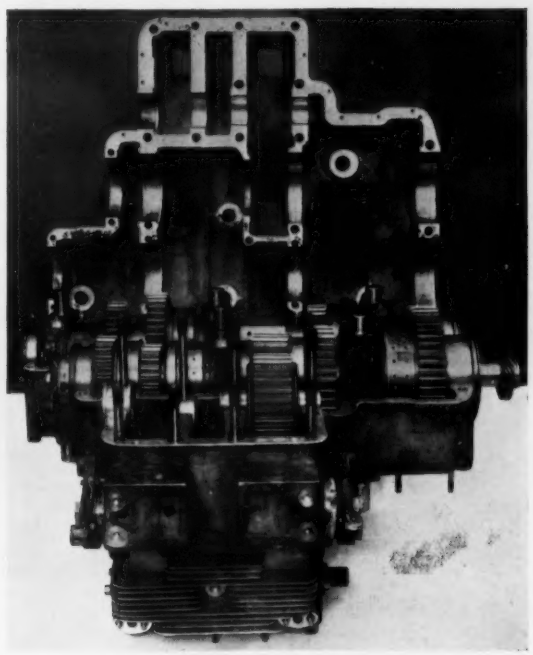


Fuel pump side of six-cylinder 240 b.h.p. Metro-Vick-Ganz four-stroke engine

Aluminium pistons are used, and are connected through hollow gudgeon pins to forged steel connecting rods having bronze-bushed small ends and lead-bronze big ends. The balanced crankshaft is a single-piece forging of heat-treated alloy steel, and both the shaft and pins are hollow-bored. A frictional vibration damper is fitted at the forward end. Lubrication is by a gear-type pump, which forces the main oil stream through the hollow crankshaft to lubricate and cool the main and big-end bearings. From the big ends the oil passes

The engine room of the Metro-Vick-Cammell railcar. The engine, mounted on the bogie, projects well above the floor level, and round it is erected a double-walled casing with an air space between the walls. The exhaust from the engine passes up to the roof through a Burgess silencer on top of the back of the casing. The fuel and water tanks are arranged above the engine

Two views of the Metro-Vick-Ganz five-speed gearbox with electro-pneumatic control of the gear-changing operations. This box is designed to take up the torque of an engine developing a normal maximum of 275 b.h.p. at 1,450 r.p.m.



through the drilled passage in the connecting rods to lubricate the gudgeon pins and to cool the pistons by spraying on their undersides. Other branches feed oil to the camshaft bearings, timing gears and other working parts. There is an oil cooler mounted on the engine and round this is circulated the engine cooling water after it has been through the radiator.

The fuel pump is of the Ganz-Jendrassik type, and is driven through a train of gears which also drive the governor and the cooling-water pump; the output of the engine is controlled by a variation in the stroke of the fuel pump plungers. A filter is fitted on one of the cylinder blocks through which the fuel passes on its way to the pumps. Starting of the engine is effected electrically. In addition to the starting motors, which are mounted on the crankcase, the engine drives through a belt a 24-volt dynamo which supplies the lighting and starting circuits; this dynamo is mounted on the bogie. On the underframe is carried a 335 amp. hr. Exide battery.

Transmission

Behind the bogie pivot, and connected to the engine by a short cardan shaft with Hardy flexible couplings, is a Ganz five-speed gearbox, preceded by a friction main clutch with Ferodo-lined steel discs and a spur-gear reverse. Both clutch and reverse gear are operated by compressed air through cylinders located alongside. From the side of the gearbox leads a double-end drive, one shaft going to the inner axle and a second shaft to the outer axle. Torque rods take the thrust from the casing of each axle drive and transmit it to the bogie frames. Like the engine, the gearbox is supported on the bogie frame through rubber cushioning blocks.

The gearbox is a light-alloy casting and contains five pairs of constant-mesh spur gears made of casehardened nickel-chrome steel. One gear of each pair is permanently fixed to the shaft, and the other runs free but may be locked to the shaft by means of a multiple disc friction clutch (one to each pair of gears), which is actuated by a corresponding air cylinder outside the gearbox casing; the contrary de-clutching is effected by the action of a spring in the air cylinder when the latter has been opened to the atmosphere. All the gears and gear clutches run in oil, and all the shafts run on ball or roller bearings. The design of the driver's control valve releases all the air cylinders whose gears are not actually in operation. The principle and the efficiency of the Ganz mechanical transmission were discussed fully in the issue of this Supplement dated July 12, 1935, and the electro-pneumatic gear-changing and remote-control equipment was described in the issue of October 30, 1936.

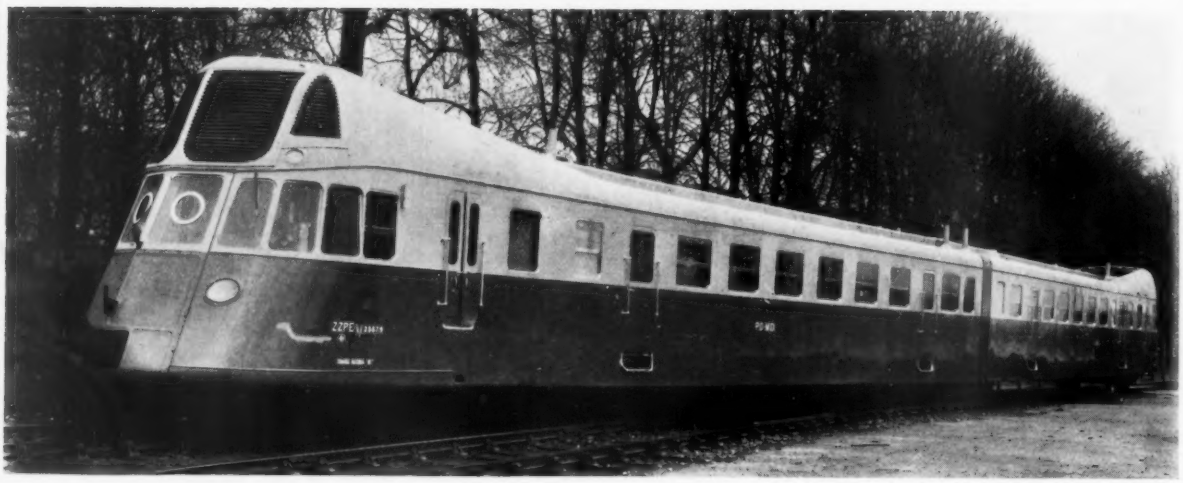
Controls

The principal controls at each driving position are (*a*) a lever controlling the direction of travel and the changing of gears, (*b*) a lever controlling the degree of fuel admission, (*c*) an automatic air brake valve, and (*d*) a straight air brake valve. Other levers or push-buttons control the electric horn, the compressed air whistle, the engine starting and the clutch engagement.

The fuel control lever operates a small pressure regulating valve which determines the air pressure in a pipe feeding the fuel control cylinder mounted on the engine. The further the lever is moved the greater is the air pressure and the further is the piston in this cylinder pressed out against its restoring spring. The piston rod actuates the fuel regulating lever of the engine. This air pipe line and the various control wires for the gear control can readily be carried through to a trailer or second railcar by means of flexible jumper connections, so that the control of the engine and transmission can be effected from the driving stand of the trailer, or in the case of a second railcar, both vehicles can be simultaneously controlled from any one driving stand.

The principal instruments in the driving position are an electrical thermometer reading, at the driver's discretion, the temperatures of the engine cooling inlet water, outlet water, gearbox oil, and coach heating water; instruments indicating engine revolutions, car speed, generator voltage, battery charging, lubricating oil pressure and reversing gear position; and air pressure gauges for the air brakes and control air system.

FRENCH ARTICULATED TRAIN



THE twin-unit articulated train illustrated above is one of three delivered recently by Renault to the P.O.-Midi Railway for operation on the line through the Massif Central between Bordeaux and Clermont-Ferrand. This 248-mile journey, with frequent grades, is covered, all stops included, in 6 hr. 39 min. These trains have been developed from the 500/530 b.h.p. Renault twin sets supplied to the Etat and P.L.M. systems in 1934 and 1935, but the power of each of the two engines has been increased to 300 b.h.p. at 1,500 r.p.m., and the old frontal radiators have been replaced by others on the roof. The P.O.-Midi trains have buffet-bars, and light refreshments are served on small tables erected between each pair of seats. The total seating capacity is 127, and postal, luggage and lavatory accommodation is provided.

Broad-Gauge Double-Bogie Locomotive for Ireland

IN our issue of March 20, 1936, was recorded the order placed with Harland & Wolff Limited by the Belfast & County Down Railway for a diesel-electric locomotive to be used on the Ardglass branch, which has 1 in 50 grades and many curves, coupled with restrictions as to maximum axle loads. This locomotive has been delivered. It was built to the requirements of Mr. John L. Crosthwait, the railway company's Locomotive Engineer.

The engine is of Harland & Wolff's eight-cylinder two-stroke type and develops a continuous rated output of 500 b.h.p. at 800 r.p.m., and is capable of a short time overload of 10 per cent. at the same speed. The controls provide for two normal runnings speeds of the engine in addition to an idling speed. Provision is also made for running the engine at full speed with the power cut off from the traction motors for the periodical equalising charge of the battery. The radiators, which are of the Serck type, are divided into two sections, the principal section being for the engine cooling water and the smaller section being for the engine lubricating oil. The fan behind the radiator bank is driven electrically, and the motor is connected to the exciter circuit so that the fan is brought into action whenever the engine is started up.

The main generator, control gear, traction motors and all other electrical gear have been supplied by Laurence Scott & Electromotors Limited. Two traction motors are used, one being mounted on each of the two inner axles of the two bogies. The motor suspension bearings are lubricated on the worsted wick system; most of the other bearings of the electrical machinery are of the ball or roller type. A Clarkson exhaust gas boiler is fitted to supply the train heating system. Vacuum brakes apply blocks on all wheels and a hand brake is fitted to the wheels of one bogie only. The total weight in working order is 48 tons, of which 23 tons ranks as adhesive; the maximum tractive effort is 10,000 lb. (up to 12 m.p.h.) and the top speed 50 m.p.h.

Double-bogie diesel-electric locomotive in Belfast yard, B. & C.D.R.

ANOTHER GIANT FOR THE U.S.A.

The first of the two 3,600 b.h.p. diesel-electric locomotives ordered by the Baltimore & Ohio from the Electro-Motive Corporation for heavy passenger service is powered by two 900 b.h.p. Winton two-stroke engines in each half of the locomotive

ON May 20 the new 3,600 b.h.p. diesel-electric locomotive of the Baltimore & Ohio Railroad (described in the issue of this Supplement for April 16, page 778) made its first test run from Chicago to Washington, D.C. Pending delivery of the second power-unit of the same type, the new locomotive is hauling the streamlined Royal Blue train between New York and Washington. When the second unit is finished, the two will be transferred to work the Capitol Limited. By way of comparison, or possibly by way of an excuse, the B. & O. took its first locomotive, the *Tom Thumb* (built in 1829) out on to the line on May 25, and ran it at the head of the original directors' car to meet the new machine at a point near Washington, and together the two trains ran into Union Station.

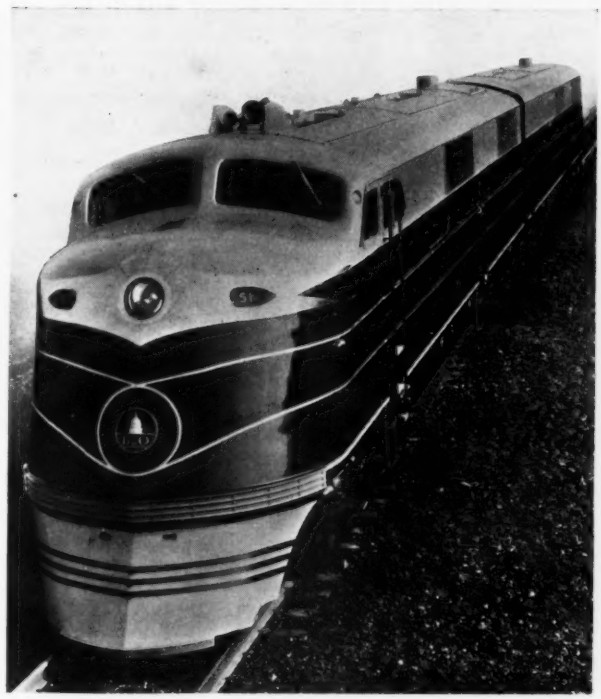
In addition to the particulars given in our April issue, the following details are of interest. All the bogie assemblies are interchangeable. Their weight is approximately 47,000 lb., and their rigid wheelbase 14 ft. 1 in. The bogie frame and swing bolster are made of cast steel, and the spring planks are of strain-relieved welded construction. The wheels themselves have a diameter of 36 in., and are of high-carbon low-molybdenum rolled steel. They are mounted on three axles with 6 in. by 11 in. journals. The cast steel Isothermos axleboxes are fitted with a spring-cushioned lateral thrust device, and their lined bearings carry a maximum journal load of 21,600 lb.

A new theory for the treatment of load suspension has resulted in improved riding qualities and greater steadiness when rounding curves at high speed. The bogie frame is supported at four points on its equalisers by twin-group coil springs of silico-manganese steel. The bolster is supported at each corner by a pair of chrome-vanadium elliptic springs, riding on two welded spring planks. These in their turn are carried by swing hangers pivoted from the outside of the bogie frame. Four hydraulic shock absorbers damp down lateral oscillation and ease the body load against the bogie frame when entering or leaving curves.

The clasp brakes have two 18-in. shoes per wheel. They are actuated by four 11-in. dia. by 10-in. stroke cylinders equipped with automatic slack adjusters. When the air pressure in each cylinder is 50 lb. per sq. in., the available retardation force approximates to 174 per cent. of the locomotive tare weight. Both automatic and hand sanding apparatus are provided at the leading driving wheels of each truck.

Control Room and Equipment

The driver is provided with an upholstered adjustable seat, and has a clear view of both sides of the approaching track through slanting windscreens of safety glass. These windows are equipped against the elements by patent wiper and hot air defroster devices. The side windows of the driving cab are of similar type, having no-draught ventilators and adjustable windows, also made in safety glass. The auxiliary driver is also provided with a comfortable seat on the left-hand side of the driving cabin, and this window is also fitted with the afore-mentioned weather defeaters.



This locomotive has eight force-ventilated nose-suspended traction motors and is fitted with supplementary separate control for each of the two half units

The indicating and recording speedometer and the usual air gauges indicating brake control functions are indirectly illuminated. To the right of these instruments is situated the wheel-slip indicator, which flashes a warning red light when any set of driving wheels is slipping. Three levers only are necessary to control locomotive movements: the main throttle; reverse handle; and air brake handle. When the engines are idling and the reverse handle is in running position, any movement of the locomotive throttle is relayed electrically through four control trunk wires to each power plant of the locomotive. These telegraphic impulses are received by an electro-pneumatic mechanism which actuates the local engine-speed governor lever, thus increasing or decreasing engine speed and controlling the individual power plant output.

Situated at the head of each engine is what is known as a local control station, whence the attendant can check up the operating condition of each power unit. Such control stations comprise individual fuel and lubricating oil gauges, r.p.m. indicator, 12-point exhaust pyrometer and an engine water thermometer. Also included are the engine starting and stopping buttons and an isolation switch having two positions, *on* and *off*. When the switch handle is moved to *off*, all the electrical control circuits to that power plant are opened and the engine speed

reduced to idling, irrespective of the operation of the remaining power units. The control circuits are closed by the return of the switch to the *on* position, and the engine at once responds to whatever power demand is being called for by the position of the locomotive throttle.

Another fitting is the trunk line alarm system, whereby abnormal engine conditions are brought to the notice of the attendant by both audible and visual means. This system includes engine-water temperature and oil-pressure switches, an 8-in. electric gong, and four illuminated enunciator signals in each locomotive unit. The enunciator boxes have three different coloured lenses indicating hot engine, low oil pressure, and heating boiler failure. The illumination of any one of these three signals causes the gong to ring, and the ringing does not cease until the failure has been located and acknowledged by the placing of the isolation switch handle in the *off* position. The gong may also be used as a call signal for the attendant by pushing a button in the operator's cab.

Feed water pumps for the train heating boiler, fire control and train line pressure regulation is entirely automatic, and adjusted by means of a single hand rheostat. The steam train line extends the full length of each locomotive unit, to provide steam for heating the operator's cab during service, and to warm the engine cooling water systems during maintenance or inspection periods. In front of the engine cab is a hood compartment, housing the 25-plate 64-volt locomotive storage battery. Access to this compartment is gained through a hinged door in the cab front partition, beneath the windscreen.

English Electric Works at Preston

ON Tuesday and Wednesday last two parties of engineers from this country and overseas had the opportunity of visiting the Preston works of the English Electric Co. Ltd., where a large number of electric and diesel vehicles are under construction. Both parties were under the guidance of Mr. G. H. Nelson, Chairman and Managing Director; Mr. J. E. Calverley, Chief Engineer, and Mr. L. H. Short, Assistant Engineer for Traction.

The principal diesel vehicles under construction at Preston are the 108 Drewry diesel-mechanical railcars for the Buenos Ayres Great Southern Railway, Buenos Ayres Western Railway, and Entre Rios Railway (for description of this design see issue of this Supplement for April 16); and the three four-car diesel-electric trains for the Ceylon Government Railways. In addition, the electrical equipment of one of the three Southern Railway diesel-electric locomotives is being installed, and during the two afternoons some of the Drewry diesel-mechanical shunters made trips up and down the Preston test track for the benefit of the visitors.

Probably the main impression gained by most of the visitors was the tremendous extent to which electric welding can be used in the fabrication of railcar bodies, underframes and bogies. It was an experience to go through a large factory full of work without hearing a rivet hammer. The mechanical portions both of the Drewry cars for South America and the set trains for Ceylon have been built up almost entirely by electric welding, and full advantage of this method of construction has been taken to put metal just where it will take stress and to have no metal where there is no stress. The majority of the vehicles under construction had underframes of the box girder type with outriggers to support the body sides, and in the case of the Ceylon trains, which are articulated, all the buffing and drag stresses are transmitted straight down the centre through the main members of the frame.

Another feature which created much interest was the extremely simple yet efficacious design of the bogie frame structures for the various types of railcars, the use of welded sections giving great lateral rigidity without excessive weight, and providing a neat solution to the problem of finding room for the right design of such parts as brake and spring hangers. All the railcars inspected had roller bearing axleboxes, those of the Drewry cars being of Timken manufacture, and those of the Ceylon vehicles being of the Hoffmann type. The Drewry cars and locomotives have 102 b.h.p. Gardner engines, Vulcan-Sinclair fluid couplings, and Wilson-Drewry epicyclic gearboxes, whereas the Ceylon trains each have two 200 b.h.p. English Electric engines built at the Rugby works and electric transmission.

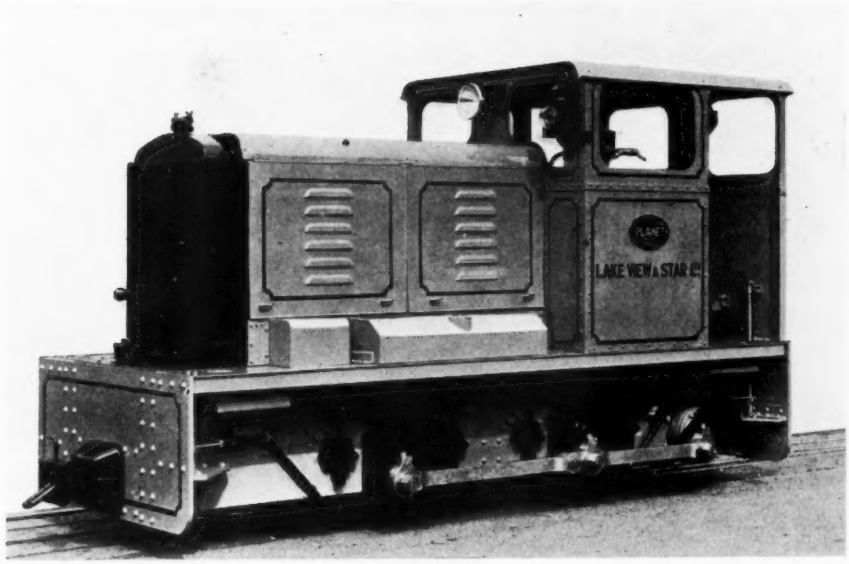
Publication Received

Theoretische und Praktische Untersuchungen über den Betrieb von Motorfahrzeugen mit Holzgas. Berne: Schweizerischen Gesellschaft für das Stadium der Motorbrenstoffe. 9 in. by 6¼ in. 277 pp., 141 illustrations. Price 10 Swiss fr.—History has a way of repeating itself, and the experiments now being made in various parts of Europe with railcars driven by producer gas, anthracite, and coal dust engines call to mind Dr. Diesel's original proposals for an internal-combustion engine using pulverised coal. In point of numbers, the most popular of the new forms of motive power applied to railcars is the wood-gas engine, used in Germany, France, Finland, Poland, and elsewhere. What must come to be something of generally-accepted text book on this type of plant (in the German language, at least) is this comprehensive report drawn up by Dr. P. Schläpfer and Dr. J. Tobler. Although the practical part of the material is based mainly on experience with road vehicles, the types of engine used in railcars are so similar as to render the data collected applicable directly to railway propositions in so far as the power plant itself is concerned. The theory of the wood-gas generator and engine is discussed very thoroughly, with the assistance of temperature curves, comparative torque curves of wood-gas and petrol engines, compression and thermal efficiency charts, and nomograms for the heat content and chemical analysis. In the second, or practical, section of the book, descriptions are given of the various types of generators available and their installation in different vehicles. The description and the illustrations are simple and clear—a good point, for there are not many railway engineers who are thoroughly familiar with wood-gas generators. This section gets down to the elements and does not assume a deep knowledge of the subject on the part of the reader at the beginning, although the reader will be very knowledgeable when he has digested all the material. A further chapter covers the economics and operation, and gives comparative costs and statistics for a variety of Continental countries. The actual operation of wood-gas road vehicles in Switzerland is considered, and detailed particulars, backed up by illustrations of various components after a period in service, provide a valuable record of some of the troubles which may be expected. There is also a full bibliography, but few of the items listed are in the English language.

HORIZONTAL ENGINES IN AMERICA.—The Chicago & Eastern Illinois Railroad has put into service between the towns of Danville and Cypress two streamlined air-conditioned railcars, each powered by a six-cylinder single-bank 190 b.h.p. Hall-Scott petrol engine. Each car will make one trip a day over the distance of 242 miles.

SHUNTING LOCOMOTIVE FOR AFRICA

Up-to-date fittings and robust construction characterise this Planet diesel-geared locomotive, which has a hauling capacity of over 200 tons under adverse conditions on 2-ft. gauge lines



12-ton locomotive suitable for traversing 65-ft. curves on narrow-gauge lines

INCLUDED in the steady flow of small diesel locomotives exported from this country is a four-wheeled 70 b.h.p. unit supplied recently by F. C. Hibberd & Co. Ltd. to the plant of Lake View & Star Limited, in Africa. Built to the requirements of the mechanical engineer of the New Consolidated Goldfields Limited, this locomotive is the first rail traction unit to have incorporated in it an Atlantic oil engine, built by the Atlantic Engine Co. Ltd.

In four cylinders having a bore of 6 in. and a stroke of 8 in., a continuous rated output of 70 b.h.p. is developed at 800 r.p.m., and fuel is injected by means of a C.A.V.-Bosch pump. The maximum rating of the engine is 82 b.h.p. Starting is effected by means of compressed air supplied by a two-stage compressor belt-driven from a 1·5 b.h.p. two-stroke petrol engine located in the cab of the locomotive. A Reliance radiator is carried at the front of the bonnet, and behind it is an engine-driven fan. A pressure gauge for the lubricating oil circuit is provided in the driving position.

From the engine crankshaft the torque is transmitted to the three-speed gearbox through a cardan shaft, flexible coupling, and multi-plate friction main clutch. The constant-mesh gears are of the straight-tooth spur type and all gear changes are made through internal or external dog clutches. The wheels themselves are of case-hardened nickel-chrome steel, and are mounted on shafts carried in ball and roller bearings. A heavy casing encloses all the gearing and there is splash lubrication to all parts. A single hand lever with gate change controls the speed selected, and the constant-mesh spur gear reverse has a separate hand lever. From the gearbox output shaft the drive is taken through bevels to the jackshaft, and thence through the usual rods and flycranks to the axles.

The mechanical portion of the locomotive is of robust construction, and is built up on a heavy plate frame structure which carries the engine directly. The wheels have a diameter of 28 in. and are spread over a base of 4 ft. 3 in.; the length over buffer beams is 14 ft., the maximum width is 5 ft. 6 in., and the height 8 ft. 3 in. In working order the weight is 12 tons, and this gives a factor of adhesion of 4·5 against the tractive effort on the bottom gear step. The speeds and rail tractive efforts on the different gear steps are:—

Speed, m.p.h.	Tractive effort, lb.
3·2	6,000
5·0	4,225
8·7	2,420

The fittings include electric cab, head and tail lights, battery, dynamo and electric horn, and, as in normal Planet locomotive practice, hand screw brakes and adequate sanding equipment are included.

BURMA RAILCARS.—Tenders are being entered for the supply of diesel-mechanical railcars for passenger service on the metre-gauge lines of the Burma Railways.

NEW ZEALAND SERVICES.—The early introduction of further railcar services on both North and South Islands has been foreshadowed by Mr. D. G. Sullivan, the New Zealand Minister of Transport.

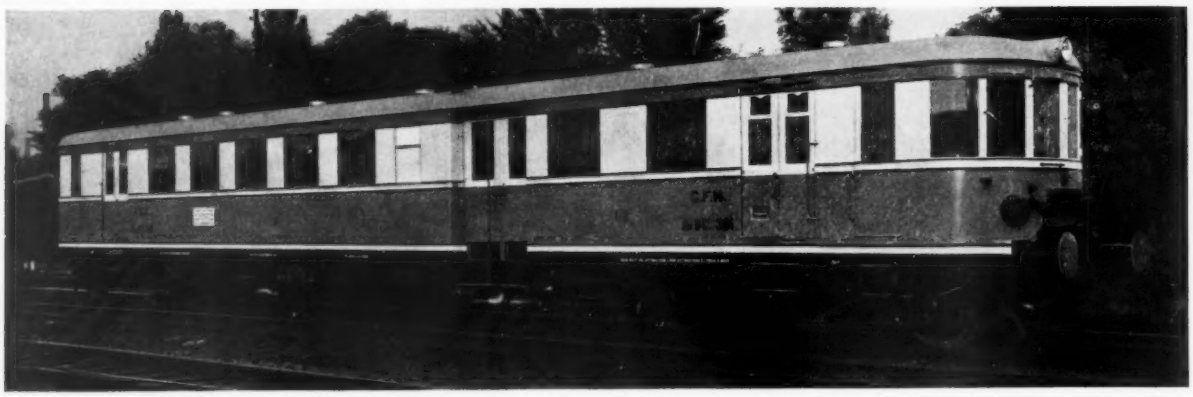
DIRECT-DRIVE LOCOMOTIVE.—After many tests and modifications, the 1,000 b.h.p. 4-4-4 Deutz direct-drive locomotive described in the issue of this Supplement for January 26, 1934, has been put into experimental working on passenger trains over the Neuss-Viersen line in Germany.

AMERICAN LOCOMOTIVES.—The Canton Railroad, U.S.A., has taken delivery of a 600 b.h.p. Winton-engined diesel-electric locomotive weighing 89 tons, and the East Erie Commercial Railroad has ordered from the General Electric Company a 55-ton 300 b.h.p. oil-electric locomotive embodying a Cooper-Bessemer engine.

NEW ITALIAN TRAIN.—The Italian State Railways have ordered from Fiat a twin-articulated diesel-mechanical train with two 400 b.h.p. oil engines, which is to be used for special State service. It is to have office and sleeping accommodation and a bathroom.

FIRST DIESEL CARS IN GREECE

44-ton vehicles for local and mixed train operation in Thrace



Two- or three-class railcar for speeds up to 56 m.p.h.

THREE double-bogie double-engined railcars have been exported from Germany recently for service on the standard-gauge Franco-Hellenic Railway. Of electrically-welded steel construction, these cars were built by the Düsseldorfer Waggonfabrik A.G. (Uerdingen Works), and have accommodation for 16 first class and 58 second class passengers seated in three saloons heated by the engine cooling water. The usual lavatory, luggage and postal room is provided.

These cars are of a powerful type and are intended for trailer haulage. Power is provided by two 170 b.h.p. M.A.N. engines, one on each bogie, running at 900 r.p.m. The six cylinders have a bore and stroke of 175 mm. by 220 mm. (6·9 in. by 8·65 in.), and the maximum rating is 190 b.h.p. at 1,000 r.p.m. There are two 24-volt Bosch starting motors (one to each engine) fed by two 400 amp. storage batteries which also supply the lighting circuits, &c., when the engine is at rest. Attached to the engine is a 500-amp 24-volt dynamo. The water and oil are cooled in two radiators located beneath the car and provided with four fans. Each engine has a fuel tank of 200 litres (48 gal.) capacity. There is a Celotex insulating lining on the inner bulkheads of the engine rooms.

Mounted behind the engine on each bogie is a T.A.G. four-speed gearbox and a cardan shaft drive to the inner axle. The gear-changing is air operated, and the four steps give track speeds of 15, 32, 50 and 90 km.p.h. (9·3, 20, 31, and 56 m.p.h.) with normal engine revs. and with 900 mm. (35·5-in.) wheels. Either or both engines and gearboxes can be controlled from each of the two driving positions.

Electric welding has been used also in the fabrication of the bogie frame structure, which is formed of plates, pressings and bars. The axleboxes are of the Isothermos type, and each is supported by an independent overhung laminated spring with helical auxiliaries. The body is carried on the bogies through long inverted laminated springs outside the bogie framing. Straight and automatic Westinghouse air brake apparatus is incorporated and there are two blocks on each wheel; the cylinders are carried on the car underfame.

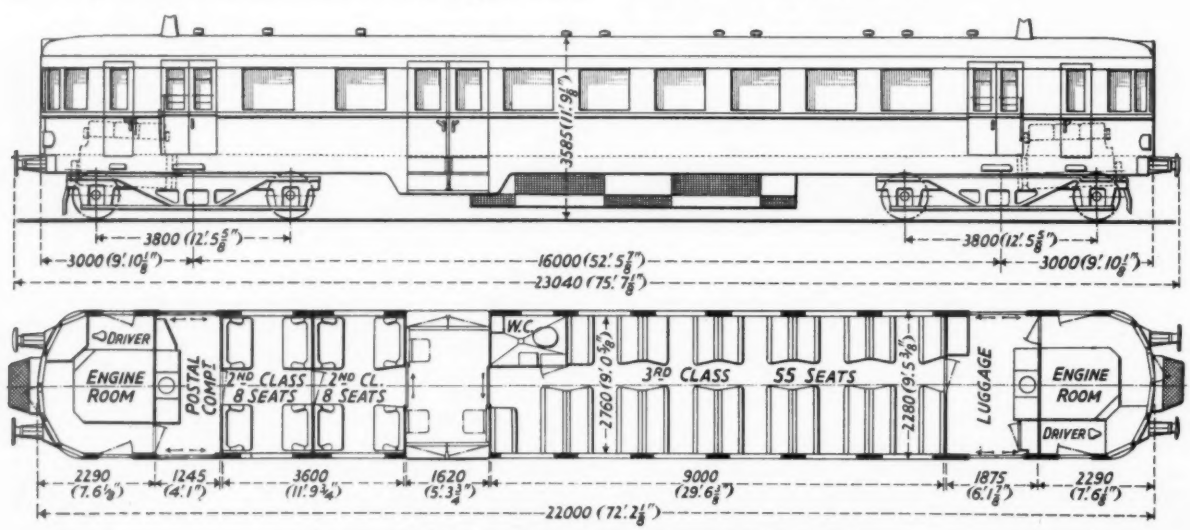


Diagram of 340 b.h.p. diesel railcar, Franco-Hellenic Railway